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UNITED STATES DEPARTMENT OF AGRICULTURE

Radio Service

OFFICE OF INFORMATION

DEC 23

WITH UNCLE SAM'S NATURALISTS. Friday, January 2, 1931.

ANNOUNCEMENT: We are back in the woods with our Wildsman today. He has been having a heart-of-the-woods talk with some of Uncle Sam's Naturalists of the United States Department of Agriculture, or rather that branch of the Department known as the United States Forest Service. ----All right, Mr. Wildsman? ----

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I just wonder what we know about our own woods. Some of us pride ourselves on our woodscraft. Some of you, of course, have a pretty good idea of the woods through which you hunt, or hike, or work.

But I must confess, there is a lot I don't know about even the trees that go to make up the woods through which I've been tramping for years. Just how much timber of the different kinds are in those woods? How fast does each kind grow? I doubt if the men who own those particular woods know any more than I do about them.

I just mention that by way of illustration. I don't feel bad about it, because Mr. C. M. Granger, of the United States Forest Service tells me that even our timbermen and foresters can't answer those kind of questions about all the forests in our country.

We talk glibly about our forest and farm woods resources being thus and so. But when you get right down to it, nobody really knows what the forest resources of the United States are. The rate of growth of the different kinds of trees in different parts of the country, the condition of the young growth, the losses from insect and disease attacks, are all questions largely unanswered.

True, we do have some general estimates. Yet those are little more than expert guesses in most cases.

Often we hear statements made about how much we are cutting compared to how much we are growing. And in some regions, that is known pretty well. Private timber owners and lumbermen have made cruises of their forest holdings for their own use. States in some cases have made surveys. The Federal government has a lot of data about our national forests. But there is no place you can now go to get all that information about all our forests and farm woods. That is the reason for the forest survey now being made by the U. S. Forest Service. Mr. Granger, who is in charge of the Forest Survey was giving me some striking facts about the scope and value of that survey.

It is designed to get for us the first complete and accurate picture ever had of our forest situation and forest needs of this nation of ours.

The Douglas fir region of the West is supposed to contain one-fourth of what is left of our sawtimber supply, Mr. Granger says. Northern California, northern Idaho and Northern Montana have almost another one-fourth. The only other place where there is any big amount of sawtimber is in the Southern pine region. How much of that is left is one of the questions the forest survey is expected to answer.

We know that millions of acres of forest land has been cut over and burned over. We know some of it is lying bare and idle. Some of it is growing new forests. We can't say for sure how much in either case. Neither do we know just how fast our forests are being depleted by fire.

How far the growth of our young forests is offsetting the drain by cutting and fire and insects and diseases and windthrow, is another of those things our forest survey will find out.

And not only are our magnificent stretches of western and southern and northern forests involved, but the old farm woods itself.

Since the World War, farmers in most of the originally forested part of the United States have left a lot of their land out of crops which they had been cultivating. Part has been used for pasture, and part has been let lie idle.

It has been estimated that at least half that abandoned farm land has gone back to woods. That brings up the question as to whether that land which it hardly pays to farm can be made to pay by growing timber crops on it.

We don't really know how much timber we have for railroad ties, nor how many ties we will need in the future. The same can be said about pulp wood for paper making and wood in many forms for all sorts of uses. This great forest survey will have to include studies of some sixty groups of wood using industries.

Then there are the many problems of finding woods that can be used as substitutes for others. In a good many cases, it seems, wood users have become accustomed to making certain things out of certain kinds of woods. Where the supply of that kind of timber is getting scarce, maybe we can find other woods we can learn to use.

The ramifications of this big question of our forest resources are numberless.

Yes, you say, but how are you going to find out all those things. This forest survey was authorized a couple of years back. It was to cost not more than three million dollars altogether and not more than a quarter of a million any one year. At that rate, it would take twelve years to complete the survey.

The size of this job is staggering, when you think of the many different things this survey includes, and what we need to know about our vast forests.

In fact, it would seem to be a job for several life-times to get all the facts to be included in this survey. But by making use of information already collected by the government, state and private interests here, and there using scientifically exact short cuts in examining large areas, the job can really be done in the time allowed.

There are eleven Forest Experiment Stations located in different sections of the country, where ample plots of timber of different ages are being measured, the condition and rate of growth of the trees is being checked up at these stations. And those samples will give a sound basis for accurate estimates of growth of the same kinds of trees under similar conditions in the different forest regions.

This forest survey, Mr. Granger explains, will throw light on the question of whether or not there is danger of a national timber famine and what we need to do to balance the national timber budget.

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ANNOUNCEMENT: Our Wildsman has just outlined for you some of the work of the forest survey as described to him by Mr. W. N. Granger, of the United States Forest Service. This Station presents these talks with Uncle Sam's Naturalists once every two weeks.

UNITED STATES DEPARTMENT OF AGRICULTURE

Radio Service

OFFICE OF INFORMATION

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WITH UNCLE SAM'S NATURALISTS

RELEASE Friday, January 16, 1931.

NOT FOR PUBLICATION

Speaking Time: 10 minutes.

ANNOUNCEMENT: Again our Wilds Man is with us. He has been out with Uncle Sam's Naturalists of the Department of Agriculture trapping a few facts about our fur supply. -----You say you are going to talk about fur, Mr. Wildsman?-----What fur? -----

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Winter time is fur time.

I don't know about you, but I generally think of bears, and foxes, and beavers and other of our bigger fur animals when anybody mentions fur. And I usually picture the trapper mushing through the North woods on snow shoes.

But Dr. J. E. Shillinger, of the Division of Fur Resources of the Bureau of Biological Survey of the United States Department of Agriculture, tells me that the most important wild fur bearer in the United States is the muskrat. And Louisiana is our leading fur State. That's largely because of its many muskrats. In fact, the value of the fur catch of Louisiana is more than that of all Alaska, if you don't count the fur-seal industry of the Pribilof Islands in the Bering Sea.

Speaking of seals, however, Dr. Shillinger tells me that the muskrat is sometimes thought of as something of a fur-seal itself. The fur known to the trade as "Hudson Seal" is really muskrat in masquerade. It is black muskrat that has had the long guard hairs plucked out, and then had that soft under-fur clipped and dyed to make a fair imitation of a real seal-skin.

Black muskrats are the most valuable kind. Most of them are caught in parts of New Jersey, Deleware, Maryland, and Virginia. You understand, there are three different types of muskrats in this country. There are the very light, silvery-brown muskrats from the South. Then there is the common brown muskrat, and finally the more valuable black muskrats.

Dr. Shillinger is making a special study of muskrats, looking into

their habits and home-life, with a view to getting more light on the possibilities of muskrat farming. And he estimates there are fewer muskrats than usual this year, on account of the drought.

They were hard hit by the big dry spell. And this is how. The rivers and other waterways that our east-coast muskrats inhabit were lower this past summer than usual. That meant that the sea water came farther up from the mouths of the streams than usual. That in turn meant saltier water than usual, which killed off many of the water plants muskrats feed on. Less food, fewer muskrats.

Muskrats feed on such plants as "three-cornered sedges" and cat-tails and bulrushes, which thrive best in brackish water. They will even live in fresh water, but they can't stand the water too salt.

Dr. Shillinger is not counting on the decline in muskrats lasting long. Usually this preferred vegetation will re-seed itself and come back quickly. For instance, the big flood on the Mississippi a few years back killed off great areas of muskrat vegetation.

It wasn't long, however, until there was plenty again to support an abundance of muskrats. We know the kind of roots and fresh stems muskrats prefer, but Dr. Shillinger says we need to know a lot more.

Muskrats will eat mussels and crawfishes. Some folks claim they have seen them do it. Whether such a diet is necessary for them is one of the questions Dr. Shillinger is looking into.

That is getting down a little further under the fur than we started. Of course, this matter of feed is bound to lie at the roots of the fur. While Dr. Shillinger was telling me all this, I couldn't get out of my mind that idea of Louisiana leading the country on fur production. The idea that fur grows thickest in the colder climates is one I was brought up on, so I asked Dr. Shillinger how it happens that the marshes of Louisiana supply so much of our fur.

Well sir, he got out a bunch of pelts of muskrats taken in different sections of the country. He showed me that the more northern muskrats, really do have the thickest fur and the heaviest skins. In quality production of fur, they outstrip their southern cousins. But there are more of those Louisiana muskrats. Whatever lack the average animal may have in value is more than made up by the larger number of muskrats in the South.

Trapping muskrats in Louisiana is quite a large-scale proposition. There is as much as 165,000 acres in a single tract of muskrat marsh. The owners run canals through, so as to make it easier for trappers to get from place to place and also to make a more uniform water level for the muskrats.

The early trappers, Dr. Shillinger tells me, went after the larger fur bearers, and didn't try to catch muskrats so much. Of course, as the years have gone by, they have been sought after more and more.

Muskrats haven't been depleted quite so extensively as have some other fur animals, such as beavers, and fishers, and martens. But Dr. Shillinger says that even muskrats have suffered heavy reductions in some sections.

One trouble is that the trapping season in many States begins too early. Many unprime pelts are taken when their value is very low. Many young muskrats, or kits, born late in summer are caught during the fall trapping when their pelts are almost worthless for fur.

If you have ever seen a muskrat in the wild you may have wondered about the appearance of the fur of even the mature animals. But, as we said a while ago, that pelt will undergo considerable change before it becomes part of a lady's coat. In the case of Hudson Seal, those long guard hairs will be plucked out, and only the soft under-fur will be left. A great many skins, however, are made up in their natural state.

Muskrats, like all other fur bearers, have two kinds of fur, a soft downy under-fur, and the long coarse guard hairs. In the case of muskrats, the fur experts treat the fur so as to get the full effect of that soft, silky under fur. In the case of a fox, however, those long guard hairs are the most prized part of the fur. A piece of fox fur lacking those outer hairs looks "ratty" and brings a low price in the fur market.

Well, I could go on for a much longer time telling you about muskrats, and what Dr. Shillinger says about them. It is a fascinating subject. There is their rate of multiplication, for instance. It seems that muskrats learn the multiplication table early. In fact, their rapid rate of reproduction has been the basis for many a scheme for selling animals for stocking fur farms. Many persons learn too late that fast multiplying fur bearers don't always multiply under semi-domestic conditions as they do in the wild. But that is another one of those problems that the Bioligical Survey's Division of Fur Resources is trying to work out.

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ANNOUNCEMENT: Our Wilds Man will be back in two weeks. Anyone interested in muskrats, can get a bulletin on that subject by writing either to this Station or direct to the United States Department of Agriculture, at Washington, D. C. Ask for Farmers' Bulletin No. 869 on "The Muskrat as a Fur Bearer."

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UNITED STATES DEPARTMENT OF AGRICULTURE

Radio Service

OFFICE OF INFORMATION

JAN 9 1931

WITH UNCLE SAM'S NATURALISTS. Friday, January 30, 1931.

ANNOUNCEMENT: Our Wilds Man is going to take us into the woods today, to get us out of the woods on some of the questions about the woods. Since he has been talking with Uncle Sam's Naturalists of the United States Forest Service, he's found out ----- but we'll let him tell you what he has found out. Well, Mr. Wildsman?

* * * * *

The other day I was roaming through the woods, when I came on a strip that has been cut practically clean; cut clean and burned over.

I got to wondering just how long it would take to get that land back in trees. Of course, I was assuming that the seed for restocking would come from the adjacent timber and be scattered in Nature's own way.

But the more I wondered, the more I realized there is a lot about growing trees we don't yet know. We've hardly scratched the bark of such questions. But thanks to the United States Forest Service we are getting busy now going after some of the answers. In fact, I took this re-seeding question to a friend of mine in the Forest Service, and he told me about some of the work along that line that has been done at the Pacific Northwest Experiment Station.

The foresters at that Station set about to find how far and how many seed is distributed, and what conditions make for the best chances of the seed sprouting and the seedlings growing up. They liberated Douglas Fir seed at different heights when the wind was blowing at different rates. Seed turned loose in a low wind at a height of 200 feet fell in quantity up to 1,200 feet away. In a very high wind, some seed traveled as far as half a mile. But in a light seed year, the experimenters couldn't find any seed more than 500 feet from the seed trees.

And another thing, on soil blackened by a slash fire, they found the surface soil in places got as hot as 144 degrees. That's enough to kill Douglas fir seedlings. That raises the question of keeping fire off of cut-over land.

Speaking of fire, you all, no doubt, know lightning is the cause of a large number of forest fires in the West. In the northern Rocky Mountains more than 15,000 reports of lightning storms have been made in the past five years. Many of those storms have never been recorded by the regular Weather Bureau stations in the farming valleys. They've been recorded by the hundreds of Forest Service lookouts.

Lightning is a swift subject. There's a flash, and the damage is done, even before you hear the crash of thunder. So what's the good of knowing about these lightning storms after they are all over. That's the way we generally think of it.

Well, it seems from what the foresters tell me that even if we can't put any chains on the lightning itself, we may be able to chain down the fire-demon the lightning let's loose in the woods. The experts at the Northern Rocky Mountain Experiment Station have analyzed large numbers of those thunder storm reports. As a result, they have found that certain types of storms are more dangerous than others.

Warnings of the approach of that type of storm can be given. Fire-fighting forces can be made ready to meet the special danger, and rushed to strategic points where they will be ready to move on any fire that starts.

It is not only for timber and for shelter for wild life that we need woods. More and more we are coming to find the value of woods in holding soil in place and preventing the washing away of the cream of our soil.

Places have been found in this country where in twenty years the land has made a complete cycle from forest through cultivation to abandonment.

Measurements made in southwestern Wisconsin, my Forest Service friends tell me, indicate that forests are the form of cover best for holding the soil from washing.

But we started on talking about growing trees. In our Northeastern spruce region, cut-over spruce lands are invaded by fast-growing but undesirable hardwoods, which prevent or hold back the further development of young spruce already on the ground.

The foresters have found, however, that by cutting back some of the undesirable hardwood trees at the proper time during the first few years, the young spruce can be encouraged without the work costing too much to be practical.

The fight between the more highly prized trees and the poorer species goes on in most all our woods. By similar work foresters in the southern Appalachian forests have found that they can also help the valuable yellow poplar by taking out the sumac and silverbell which compete with it for a place in the sun. Neither the silverbell nor the sumac ring the cash register.

But the men in the Forest Service have been doing more than protecting our woods and taking sides in the fight between timber trees and weed trees. They have actually learned, in some cases, how we can control the quality of the wood and grow it in the woods with an eye to what it will be used for when it is cut.

For instance, the Southern Forest Experiment Station specialists have shown that for southern pine a moist site, protection from fire, and growing the trees close together in thick stands produces dense, strong wood. On the other hand, to grow wood of moderate strength and grow it fast, open spacing of the stand gives quicker results.

But you know there is considerable difference in the way pine trees grow and the way hardwoods grow. The hardwood trees, it has been found, produce their strongest wood, when growing fast in open stands, or when the stand has been thinned out.

Knowing that, we have the key to the way to grow timber to fit certain uses, and to make the woodland pay best. And we've learned that by checking up on Nature's way of doing; by testing the wood for the same kinds of trees growing under different conditions.

Even the lean of the tree from the vertical position, has an important effect on the lumber we get. The more the tree leans the more of what is known as "compression" wood is produced. Compression wood is recognized as a source of the abnormal lengthwise shrinking in softwood lumber.

These are just a few of the things found out about the secrets of the wild recently, which are proving useful in taming tree growing to our own uses. In California, a comprehensive logging and milling investigation was made in which a thousand trees cut into about five thousand logs were followed from the woods through the mill to the finished product. The idea was to find how much lumber of the different grades each tree yielded.

It would seem that we might extend that old saying "as the twig is bent." As the twig is bent, the tree is inclined, and the lumber is warped.

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<u>ANNOUNCEMENT:</u> We will have another visit with Uncle Sam's Naturalists two weeks from today. This station presents this feature twice a month in cooperation with the United States Department of Agriculture.

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UNITED STATES DEPARTMENT OF AGRICULTURE

Radio Service

OFFICE OF INFORMATION

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WITH UNCLE SAM'S NATURALISTS

Fri. February 18/31.

NOT FOR PUBLICATION

ANNOUNCEMENT: And now for another of those visits with Uncle Sam's Naturalists of the United States Department of Agriculture. Our Wildsman has been on the trail of a fur coat, and the trail seems to have led him right back out of the woods ----- But you tell them, Mr. Wildsman. ----------

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Many a fine-looking garment is made of rabbit skins -- Only they don't call them that. Rabbit fur goes by a lot of other names. "Electric Seal," for instance, is made from rabbit fur clipped and dyed to look like seal. Beaverette is a fairly good imitation of beaver made from rabbit. Fact is, there is a wide variety of trade names for rabbits in the form of fur coats. And, of course you know, another big use for rabbits is for felt hats, and for linings for gloves.

However, those are not the kind of rabbits you get when you go out hunting. Pelts of the wild cottontail rabbits found in abundance in the United States, and of the wild hares commonly called jack rabbits, are thin and poor in quality and of practically no use to the furrier. Enormous quantities of rabbit skins are imported from Australia, New Zealand, Belgium, France, and other foreign countries. These skins meet the demands of the American fur trade and are used extensively in the manufacture of fur garments and of the trimming for cloth coats. Every domestic rabbit skin, however, with the exception of those from the Angora rabbit, has commercial fur value, regardless of size or color. Pure-white skins are preferable because they can be dyed light, dark, or medium shades of any color demanded by the fur trade. Breeding has greatly improved the domestic rabbits for these purposes as compared with their relatives the common wild cottontails and our native hares, or jack rabbits. Produced under conditions that favor rapid growth, the young hutch-raised rabbits reach an average weight of 4 pounds at 8 weeks of age--a size equal to or larger than that of cottontails in three times as long a period.

From what Mr. John W. Meyer, Director of the United States Rabbit Experiment Station, at Fontana, California, tells me, some folks have the mistaken idea that domestic rabbit meat is only good to eat in the seasons of early fall and winter when wild rabbits are hunted. Domestic rabbit is in season all the year round. --------Yes--------Yes, I know we started to talk about fur-------- but the rabbit, you know, is a two-purpose animal. Domestic rabbits are utilized for both fur and meat.

In fact, it is only by selling both the fur and the meat that rabbit raising can be carried on profitably. Rabbit fur is popular because of its light weight and because it is not very expensive. The individual pelts don't bring high prices.

But when we say domestic rabbits, don't get the idea that they are our own wild rabbits domesticated. Our domestic meat-and-fur rabbits are descended from wild rabbits of Europe, which were domesticated a very long, long time ago. The Chinese appear to have bred rabbits for sacrificial purposes in the time of Confucius, and domestic varieties are mentioned in the early literature of the Greeks and Romans.

The principal breeds used in this country were developed in Belgium, England, and France. In those countries, domestic rabbits are raised quite extensively to help supply meat for the family. Each farm house will have a few of them.

In fact, about 98 per cent of the rabbit fur used in this country comes from abroad, including the better qualities from the European domestic rabbits and the wild rabbits of Australia and New Zealand.

Because of our dependence on other countries for so much of our rabbit fur, and because rabbits multiply so fast, many folks have seen big opportunities in rabbit raising.

Domestic rabbit raising, as an extensive industry, started on the Pacific Coast and has been gradually spreading toward the East. Mr. Meyer tells me that at present livestock farmers in the Middle West are taking up rabbit raising as something new. And, they are fast putting the business on a commercial basis. The general trend is toward a small number of rabbits raised as a side line in connection with other farming, just as chickens are most often raised. That's also the present trend on the Pacific Coast.

At first, rabbit raising was promoted as a scheme for selling breeding stock on a large scale. The fast multiplying of rabbits made a strong talking point for the salesman, who could show you how to get rich disposing of the progeny of a few pairs of rabbits over a period of only a few years.

But few folks seem to realize that to make rabbits pay in practice, as well as on paper, takes a good-sized production of young.

The general practice is to breed four litters of young a year, and retain about six young to the litter. That means twenty-four young a year. Mr. Meyer, however, says his experience at the United States Rabbit Experiment Station at Fontana indicates that that many are necessary for the rabbit farmer to make a reasonable profit over and above the cost of production.

This business of rabbit raising is so new in this country that there are a lot of things we have yet to learn. That's the reason for the experiment station. Mr. Meyer and his assistants are developing methods of feeding, and breeding, and handling, and housing, and disease control.

Up until this station was established, the business had grown in a haphazard sort of way, with breeders learning from trial and error. But the business has grown. The first promoters sold stock on the unit

plan. That is, they would sell units of so many does and bucks, and operate them for the owner. Generally, the owner of these rabbit units got what the little boy shot at.

Another plan that seems to have proved workable was that of a slaughter-house selling breeding stock to farmers with an agreement to buy back all the rabbits produced at so much per pound for so many a year. In fact, Mr. Meyer says that this method looks promising, but no definite conclusions can be drawn at this time regarding its success.

While there is still in the minds of some persons a prejudice against raising rabbits for food, the market for rabbit meat is gradually developing. Intelligent propaganda will familiarize the public with the true condition in the industry, and the merits for both rabbit meat and fur will be easily understood. Cooperative marketing is an urgent need, and it requires organized effort to make it effective. But, as Mr. Meyer suggests, rabbit raising is comparatively a new industry, and it is only a question of time before there will be a stable market for rabbit meat and fur.

A copy of Farmers' Bulletin 1519-F, entitled "Rabbit Skins for Fur," will be sent you on request. Write for it to the Office of Information, United States Department of Agriculture, or to Station _____ and ask for Bulletin 1519-F.

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ANNOUNCEMENT: You have just had a brief sketch of our rabbit raising business as outlined by the director of the United States Rabbit Experiment Station, maintained by the United States Department of Agriculture, at Fontana, California. This is one of the regular visits with Uncle Sam's Naturalist presented by Station_____ once every two weeks.

UNITED STATES DEPARTMENT OF AGRICULTURE
Radio Service
OFFICE OF INFORMATION

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WITH UNCLE SAM'S NATURALISTS. Friday, February 27, 1931.

ANNOUNCEMENT: And now for our visits with Uncle Sam's Naturalists of the United States Department of Agriculture. Our Wildsman tells us they are getting ready for spring now. At least, the foresters seem to be —— Isn't that right, Mr. Wildsman?

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Yes, it won't be long now. Promptly as the snow goes off in the spring, the United States Forest Service, will go back to planting trees on some of the burned-over sections of our national forests.

Of course, tree planting is not just a spring proposition. The Forest Service began its annual planting operations last fall. At that time, that branch of our great Department of Agriculture had about 15,000,000 young trees on hand in its nurseries.

Most of the fall planting was in the Lake States and in Idaho. Some winter planting was done in the South. This spring planting will be begun again in the Monangahela National Forest in West Virginia, and near Halsey in the Nebraska National Forest, and on the Pike National Forest in Colorado, and in the St. Joe National Forest in Idaho. Planting will also be done again this spring on some of the Lake States national forests, and probably on the Columbia National Forest in Washington.

That planting on the Pike National Forest in Colorado is a good example of Forest Service tree planting. The foresters tell me much of the forest around Pikes' Peak was badly burned over in a series of fires nearly 50 years ago. That was before the Pike National Forest was created. Those big forest fires laid bare a wide territory. Sometimes after fires, Nature takes hold and reseeds the land, and forests again gradually take possession. But, around Pikes' Peak there, that stretch of burned over land was burned so badly that it has not reforested itself. Planting was the only remedy.

Eventually, the government foresters say, we will probably get good returns in timber production from the planting that is being done there. But timber is not the main thing they have in mind right now. In this particular case, the chief object of the planting is to improve the valuable watershed. Important cities are dependent upon this reforested land for their city water supply.

That is just a sample of the Forest Service's work. From time to time, it has taken over lands that before it got control were denuded by fires or cut-over or otherwise swept clear of timber. Of course replanting all those burned and cut-over sections suited to reforested and needed for timber and watershed protection would be a

gigantic job, even for such a wonder-worker as that mythical lumber-jack, Paul Bunyan, who played such a big part in the cutting over. However, our foresters claim it would pay to do it.

Their rule for planting is that the planting must be economical and must benefit the public. As they see it, forest planting is strictly a question of the proper use of the land. The Forest Service recognizes that in all its work and applies the principles of conservation.

You know, it is estimated that some 2,000,000 acres of our national forest land need planting to restore them to productiveness ----- But let's get a little closer to the floor, the forest floor, on this question of planting.

You know the old saying, "Great oaks from little acorns grow." So do other great trees grow from the little seed. Naturally, to plant you need planting stock and to grow planting stock you need seed.

The first step in planting is therefore to collect the seed. That is not always as simple as it sounds. As experienced foresters will tell you, tree seed crops are uncertain. The seed crop often fails.

For that reason, our forest planters must lay by a good supply of seed when we have a good seed year. However, there are so many kinds of trees, growing under so many different climatic conditions, in this broad land of ours, that there is always a crop of good seed somewhere, even the some species may fail entirely.

The recent crop of seed in the Pine Belt of the South was generally very light. But enough good quality seed was gathered here and there to meet the needs of the nurseries.

Good Norway Pine seed was gathered near Cass Lake in the Lake States region. And better and cheaper seed have been insured by a new seed extracting plant recently installed in the Chippewa National Forest in Minnesota.

This past year, there were fine crops of western yellow pine and Jeffrey pine in California. A number of the unemployed seized the opportunity to gather cones and sell them to the local Forest Service nursery.

Forest Service employees dry the cones and extract the seeds in the winter months for planting in the nursery beds in the spring.

But the Forest Service is not alone in this work. Many States co-operate with the Forest Service by maintaining forest tree nurseries, where planting stock is grown for distribution by state foresters to farmers, and owners of private woodlands and timberlands.

I said "many States". There are now 41 States taking part in the planting program. Last year about 25,000,000 trees were produced for

farm planting. And most of those 25,000,000 were grown in State owned and operated nurseries. In a few cases the trees were grown in Forest Service nurseries, but the U. S. Forest Service produces chiefly for our national forest planting.

According to what Mr. E. E. Carter, of the branch of Forest management of the U. S. Forest Service says nature will reforest the lands now being cut-over on our national forests, because under the system of cutting followed enough good seed trees and young growth are left standing to make that possible. That kind of careful cutting is also being done on some private lands. But not much. There is practically no tying in of planting with cutting operations on the bulk of the privately owned timberlands.

Talking about 25,000,000 trees for farm planting, and all the planting being done on burned over or cut-over lands in all our national forests and in 41 States sounds big. And we are beginning to wake up. But what we are doing seems small compared to the way we are using timber.

You know, one of these end-to-end calculators has figured that a whole year's production of American sawmills, some 33 to 44 billion board feet -- is enough to build a boardwalk 25 to 35 feet wide across the abyses of space between the world and the moon. Of course, nobody's figuring on building that boardwalk; but that's a lot of lumber.

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ANNOUNCEMENT: Every other Friday Station_____ presents these results of visits with Uncle Sam's Naturalists, in the United States Department of Agriculture. Remember the day and hour when our Wildsman will be back.

UNITED STATES DEPARTMENT OF AGRICULTURE
Radio Service
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WITH UNCLE SAM'S NATURALISTS.

MAR 16 1931

RELEASE Friday, March 13, 1931.

(NOT FOR PUBLICATION)

SPEAKING TIME: 10 Minutes.

ANNOUNCEMENT: "Spring comes slowly up this way" and "the time of the singing of birds is come." And our Wildsman has been having another little neighborly talk with Uncle Sam's Naturalists of the United States Department of Agriculture. As befits the season, the talk was with birdmen about our neighbors, the birds. -- Well, Mr. Wildsman chirp away. ---

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These days you hear a lot about building bird houses, and attracting birds.

Mr. W. L. McAtee, in charge of the division of food habits research, of the United States Biological Survey, and one of the Government's chief bird-men, has been telling me why there is more need now for bird houses than ever before.

Maybe you think it is because of fewer birds in the country. But that's not the whole story. In fact, Mr. McAtee says, we probably have more birds and a greater variety of birds now than there were back in the pioneer days, when dense forests covered most of what is now the eastern part of the United States.

Most of our birds don't live in dense forest. Of course, there are some forest birds, but there are comparatively few that dwell in the deep woods. Most of our birds live around the edges of the forests. They prefer more open country.

Mr. McAtee says the numbers of our common birds must have increased tremendously with the opening up of the country, and the clearing off and thinning out of woodlands. The groups of birds that live in shrubbery and grasslands are much more numerous than those that inhabit the deep woods.

Up to a certain point, clearing the land is favorable for birds. However, many of our well-known birds in the wild live in holes in trees and the like. Around cities and even on farms such sites are becoming few and far between. In caring for our trees also, we plug up such natural bird refuges. Thus when use of the land increases, the birds lose much of the shelter to which they are accustomed.

That is the reason, Mr. McAtee points out, that we need more bird houses to attract the birds.

There is no question in his mind that, taken by and large, birds are worth attracting. Some of them at times do considerable damage to fruit, but the point is, the man who doesn't have a continuous population of birds on his place may suffer from the depredations of invading flocks of birds that come in to get his fruit, and during the rest of the year he gets no benefit from having a steady population of them working on his place to help protect his plants from insect enemies.

Mr. McAtee says that on the farm practically all birds pay for what they take.

I asked him about the danger of attracting birds you don't want as well as those you do. And about the likelihood of some of the birds killing off the more desirable ones.

Near Washington, he told me, the United States Biological Survey has one hundred bird houses on three and a half acres. At no time in the past five years have all the houses been occupied, but eight different kinds of birds, including sparrows, house wrens, flickers, bluebirds, crested fly-catchers, tufted titmice, starlings, and martins, have been attracted to these houses and have lived as close neighbors apparently in great harmony.

Mr. McAtee says that he has never seen any aggressive action on the part of the English sparrows, which are considered by some folks as notorious gangsters. Nor has he seen any trouble between starlings and any of the other birds. These traits, therefore, are not omnipresent.

In the time the bird settlement mentioned has been in existence there have been a couple of murder mysteries, with evidence pointing to birds as killers. One flicker was found in a bird box with a hole in its head, and starlings were suspected. But in another case, a starling was found killed in a similar way. So the score is even. In fact, according to Mr. McAtee, a lot of us have prejudices against birds that are badly founded.

"Most persons seem to think the robin a little angel and to regard the bird as almost sacred," Mr. McAtee says, "but robins take many a cherry from the farmer's trees, and their food at other times consists largely of earth-worms, which are themselves beneficial in mixing up the soil and digging burrows, which let air and water into the soil and otherwise improving its condition.

"On the other hand, the European starling, which now has such an un-savory reputation, is one of our most beneficial birds in its food habits. A high proportion of its diet is made up of white grubs, which damage grass roots and other vegetation. They also specialize in eating millipeds and crane-fly grubs, which damage forage crops.

Of course, the starling has become unpopular because it gangs together in such large flocks as to become a nuisance, especially in cities. Mr. McAtee points out, however, that the English sparrow is not now so common as it was a few years ago, and he thinks it possible that the starling will eventually show somewhat the same adjustment. It seems that when some birds are introduced into a new country, they breed and spread at a tremendous rate for a few years while they are occupying the land, and then drop back to numbers that can be continuously supported.

If you want further details about the European starling in the United States write for Farmers' Bulletin No. 1571-F.

---No, it seems there is little reason to deprive yourself of the help and the music and beauty of birds for fear of getting some you don't want.

And if you build a bird house, better build it on a post low enough to reach it for cleaning. Mr. McAtee says he has noticed that when houses are put high up in trees or other inaccessible places they seldom if ever get the regular cleaning they should have.

For some unknown reason, the birds seem to prefer a house on a post to one that is placed in a tree. If possible, the house should be placed where it will be shaded a little. Full sunlight or complete shade is not so good as a happy medium between the two.

It may be well to put a sheath of metal around the post to keep snakes from climbing up. Mr. McAtee told me that they have had several clutches of eggs disappear completely, without a trace of shell or other mess such as a bird would make. They can't figure who could have stolen those eggs so neatly, unless it was a snake, although they have seen no snakes about the place.

In building the bird house use rough lumber, make a sloping roof, with the entrance hole for the bird close to the top and well protected by a rather wide overhang of the roof. Build the house so that it can be cleaned out readily. Exact plans on how to do this, with the sizes of the entrance holes for houses for different kinds of birds, and other details, can be had from Farmers' Bulletin No. 1456-F on "Homes for Birds."

CLOSING ANNOUNCEMENT: You can get the bulletins mentioned by writing either to this Station or direct to the Office of Information, United States Department of Agriculture, Washington, D. C. They are free as long as the supply lasts. The one on "Homes for Birds" is Farmers' Bulletin No. 1456-F. The one on the "European Starling in the United States" is Farmers' Bulletin No. 1571-F.

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UNITED STATES DEPARTMENT OF AGRICULTURE

Radio Service

OFFICE OF INFORMATION

★ MAR 31 1931 ★
U. S. Department of Agriculture

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WITH UNCLE SAM'S NATURALISTS RELEASE: Friday, March 27, 1931.

ANNOUNCEMENT: And now for our visit with Uncle Sam's Naturalists. Every other week our Wilds Man goes to the specialists of the United States Department of Agriculture to check up with them on some of the things he finds in the woods --- but today he is just going to take us to the edge of the woods, as it were --- He is going to tell us what cities, and towns, and counties are doing in the way of establishing community forests ------ Well, Mr. Wildsman? ----

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Yes, more and more of our cities, and towns and counties are going in for forests.

That is not just a matter of fixing things so we can still look at the woods and still enjoy the privileges of roaming through the forests when we have a mind to. Of course, the recreation feature is one of the big reasons for many of these woods. Others have been established as a means of protecting the watershed. And some combine the beauties of Nature and watershed protection with the more tangible values of timber growing. In fact, Mr. C. E. Randall, of the public relations branch of the United States Forest Service, says there is no reason why community forests should not be a source of income to their collective owners as are the community forests of Europe.

You, know, it is just in recent years we have gone in for city forests in a big way. There are now more than three-quarters of a million acres of timber land classified as municipal forests, in this country.

The movement has grown amazingly in recent years. In Massachusetts, there are 84 communities with municipal forests. New Hampshire has more than sixty town forests. Vermont has 24.

New York State has more than 200,000 acres in municipal forests, New Jersey has 35,000 acres. Maryland cities have also bought forest land.

Ohio has five communities with local forests, and Colorado has seven cities with forests. Oregon cities have forests.

We have probably left out a number of the forests --- but that's enough to show how wide-spread the movement is becoming.

In many cases, the original aim in establishing forests has been to protect the watershed and assure the city, or town or other community organization, a pure water supply.

However, as the movement continues, more and more cities Mr. Randall says, are seeing the possibilities of making the forest pay through the sale of timber grown under forest management.

Back in 1763, the little town of Danville, New Hampshire, set aside 75 acres of timberland, the proceeds of which were to be applied on the payment of a minister's salary. That has been done for 168 years and the fund has a bank balance of more than $10,000. All during that time, the ministers have received their salary from the sale of wood from that tract, and it promises to give an annual return for another hundred years, or maybe a thousand.

--- Yes, a thousand years or more. Mr. Randall tells me that one of the communal forests belonging to Zurich, Switzerland, has actually been traced back to the year 851. That forest has 2,560 acres of timberland, and it yielded an average net income of $20,000 or about $8 an acre a year for the one ten year period for which there are figures. Instead of selling the timber as it stands, the city cuts it and so gives work to about 100 men the year around.

At least two thirds of all the forests in Switzerland are owned by local communities. In Germany, about 20 per cent are owned that way. In France the communities own about twenty-two per cent of the forests. In Czecho-Slovakia they own nearer fifty per cent.

Germany has at least 1,500 town-owned forests. Five hundred of those not only pay all the local expenses, but return the surplus as a bonus to the citizens. At the same time, they have high recreational value, and serve as game refuges and bird sanctuaries.

In France, towns or communities own woodlands to the total amount of 5,000,000 acres. Most of the European countries have many more forests in town ownership than in this country.

As a rule, the town forest of Europe is under some State supervision, with the forester being paid by the town. Where the towns don't own mills, the trees are marked by the forester and sold to the highest bidder.

The policy is to cut no more in one year than the annual growth of the whole forest. In that way, cutting can be done every year until the end of time. It is estimated that the average net profit from the European town forests is $5.00 an acre a year.

Those European community forests, Mr. Randall says, are usually managed by highly trained foresters, who see to it that the land is devoted to the best paying kinds of trees. They select timber for cutting only when it has passed its most profitable period of growth. And after cutting, it is immediately followed by natural or artificial regeneration of young trees of valuable species.

The idea is to keep timber growing all the time and to so balance the

cutting of mature trees with the increase from new growth so that the standing material, the capital stock of the forest, is not diminished.

In some cases, the revenues from European community forests have been enough to pay all the taxes, corresponding to our county, town and school taxes. In fact, in some cases, Mr. Randall says, the community forest not only pays those taxes but yieldsa yearly dividend to the householders of the community in the form of free fuel.

In Orsa parish, in Calecarlia, Sweden, instead of paying taxes, some years the inhabitants have been reported as receiving a dividend in the form of free seed grain for spring sowing. Since time immemorial, people of that parish have owned forest lands in common.

Of course, Mr. Randall points out, those are just examples of what other folks have done with community forests. It may be far from possible for some communities in this country to duplicate any such record as that.

But it is possible in many parts of the United States to buy forest land almost within a stone's throw of many of our communities and that at prices much lower than some European communities have paid for bare land.

However that may be, with the increasing values of forest products, and more knowledge about management of forest trees, and better forest fire protection, and these cheap forest lands, town and county forests are likely to increase in number and size, and to become much more important as a source of our future timber supply.

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ANNOUNCEMENT: The discussion you have just heard about community forests comes from the United States Forest Service. The Forest Service is part of the United States Department of Agriculture with which this Station _____ cooperates in presenting the visits WITH UNCLE SAM'S NATURALISTS, every two weeks.

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UNITED STATES DEPARTMENT OF AGRICULTURE

Radio Service

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U. S. Department of Agriculture

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CHATS WITH THE WEATHER MAN. RELEASE Friday, April 3, 1931.

ANNOUNCEMENT: And now for our chat with the weather man. Every two weeks, you know, our old friend Ob. Server, tells us something about the work of the weather specialists of the United States Weather Bureau and the ever-facinating subject, the weather-------Well, see what it is now-------Go ahead, Mr. Ob. Server-------

*****

Well, let's talk about the beautiful flowers and trees down near the South Pole.

Or rather, let's talk about what takes the place of flowers and trees in the Polar regions.

I guess most of us picture the Antarctic as one vast stretch of cold, barren ice terrible in its awful sameness. And so it might seem, but for the gorgeous colors, and queer circles, and bars, and streamers, and other optical wonders which blossom in the Antarctic sky.

Mr. William C. Haines, of the United States Weather Bureau, who was meterologist with the Byrd Arctic and Antarctic expeditions, says it was a pity they didn't take a great artist along to paint the Polar scenery with the brilliant sky coloring which so often relieves the monotony of snow and ice which covers the landscape. Photography can not catch the coloring, and the ordinary camera does not have wide-enough lense to take in the curious patterns of light formed around the sun and moon under certain weather conditions.

According to Mr. Haines, the very coldness of the Antarctic plays a big part in producing those gorgeous flowers which do so much to make life endurable for those who go to the ends of the earth for science sake.

The tiny ice particles in the frigid air of the Antarctic often break up the sun light and moon light in such a way as cause many different types of rings.

Sometimes, there will be a pillar of light apparently rising from the sun and branching out at the top. More often there will be a circle or halo around the sun or moon. Occasionally, there will be a cross, or even a cross within a circle and another bigger circle around that. Sometimes these geometric figures in the air will be still more complicated and on the rims of the circle, will be segments of other circles, with streaks of light called sun-dogs on guard on each side of the sun.

Mr. Haines says these curious designs appear most often when there are high fleecy clouds in layers in the sky, with sunlight striking the frost particles in the air.

The reason there is one design at one time, and another at some other time, Mr. Haines explains, is probably largely due to the way most of the crystals of ice in the air are turned toward the light. If the light strikes the greater number of these exceedingly small six-sided prisms of ice at one angle, the light is broken up to form maybe one circle, and when these frost particles present a slightly different face to the light the result may be a double circle or other more intricate design. Just how they are formed, however, is quite a complicated problem in meterological physics on which our weather men have been working for years.

Often these sky drawings fade away in a few moments like a rainbow after a spring shower. At other times, they may linger for hours.

But in addition to these figures, there are the most gorgeous sky colors in the Antarctic than in any other place in the world. Red, and orange, and yellow, and violet, and green are most often seen. And at the times of the year when the sun is skirting the horizon all day long just before it disappears for the long Polar night, you practically get gorgeous sunsets for twenty-four hours at a stretch and of such brilliance as to make the glory of our western sunsets seem pale by comparison.

Another optical phenomena Mr. Haines saw while at the Byrd expedition weather station in Little America, was that kind of phenomenon known as looming, which is often also noted at sea.

Due to difference in density of the air, he says, light rays are so bent that it is possible to see objects which are actually below the horizon and ordinarily completely out of sight.

Once while with a party at several miles from the base station, and at a point where the radio towers were normally hidden from view, Mr. Haines declares he saw the towers in plain view in the sky. At another time, other objects in low places and hidden behind intervening hills of ice were brought fully into view through this well-known and curious phenomena.

But those things were seen in the summer day of the Antarctic. Now, at the time we are just entering our spring time, the long Polar night is just descending on the vast stretches of Antarctica.

From the latter part of March to the last of November, our South Polar region is going through its winter. The sun has disappeared. But, Mr. Haines says, don't imagine that the Antarctic is without its "flowers" even during the Polar Night, for the famous electro-magnetic phenomena, Aurora Australis may be seen shimmering in the sky most any time the weather is clear.

The Aurora Australis is the Southern counterpart of the well-known Northern Lights. Mr. Haines says, he does not know which are the more brilliant of the two.

These lights are seen sometimes as streamers, and sometimes as wavy curtains of vari-colored light, sometimes as arches or bands of light, and at others as streamers running from the horizon up to the zenith.

The color is usually white or greenish white but occasionally brilliant hues of green and pink and red and violet made their appearance.

Sometimes the lights appear steady and at others the colors are changing all the time in a pulsing movement.

Nor are these displays of shimmering colored lights a rare thing. Mr. Haines' records show that all through the Polar darkness from April to October, the Aurora was visible on 90 per cent of clear nights or twenty-four hour periods.

ANNOUNCEMENT: You have just heard a description of the "flowers" of the Polar regions by Mr. William C. Haines, of the United States Weather Bureau. This chat with the weather man is presented by Station _____ in cooperation with the United States Department of Agriculture of which the Weather Bureau is a part.

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UNITED STATES DEPARTMENT OF AGRICULTURE

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APR 13 193
U. S. Department of Agriculture

WITH UNCLE SAM'S NATURALISTS

Friday, April 10, 1931.

(NOT FOR PUBLICATION)

Speaking Time: 10 Minutes.

ANNOUNCEMENT: We will now hear from our Wildsman, as to the results of his most recent visit with Uncle Sam's Naturalists. This time he has secured information of importance to hunters who are even now looking ahead to the opening of the open season on migratory game birds next fall ---- Well, Mr. Wildsman? ------

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I suppose all you hunters have heard about the new hunting regulations under the Migratory Bird Treaty Act. There are some important changes in the regulations on waterfowl and other migratory game birds this year.

Colonel H. P. Sheldon, of the Division of Game and Bird Conservation of the United States Biological Survey, has just been explaining them to me.

Of course, you all know, one of the chief reasons for the changes is the damage the drought did to ducks and other waterfowl. Sportsmen and game protectors in nearly all parts of the country seem to agree that the numbers of waterfowl have been very much cut down by food-supply conditions over much of the breeding range of our chief game birds. The pools don't all have to dry up completely to kill off many of the waterfowl food plants. Changes in the water level and condition of the water have a very decided effect on some of the water plants these birds depend on.

Anyway, our bird protectors figure the new regulations will save a good many birds, and give them a better chance to come back. Throughout the country, fifteen days has been lopped off the open season. The season was shortened at the end in nine of the Northern States; at the beginning in seventeen of these States; and at both the beginning and the end in four States. In the southern part of the country, the fifteen days has been taken off the end of the season; so the season will end fifteen days sooner than heretofore.

The open season under the new Federal regulations will be from October the first to December 31 in the States of Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut, all of New York except Long Island, Pennsylvania, West Virginia, Ohio, Michigan, Indiana, Illinois, Wisconsin, Minnesota, Iowa, Missouri, Kansas, Nebraska, South Dakota, North Dakota, Montana, Wyoming, Colorado, Utah, Idaho, Nevada, California, Oregon, and Washington.

Now in that part of New York known as Long Island, and in New Jersey, Delaware, Oklahoma, New Mexico, Arizona, and in north and west Texas, the open season for waterfowl under the revised regulations will be from October 16 to January 15. In the south and east parts of Texas the open season will be from November 1 to January 15.

The open season will run from November 1 to January 15 in Maryland, the District of Columbia, Virginia, Kentucky, Tennessee, North Carolina, South Carolina, Georgia, Alabama, Mississippi, Arkansas, and Louisiana, while in Florida, the open season will be from November 20 to January 15, fifteen days having been taken off the end and nineteen days from the beginning of the season.

Under the regulation the open season for waterfowl does not include snow geese in States bordering on the Atlantic Ocean, or Ross's geese and cackling geese, which look like miniature Canada geese, in their range chiefly along the western coast.

Of course, that shortening of the season is the big thing. At least, Mr. Sheldon and the other experts in charge of the regulations hope it will be the big thing for the ducks and geese.

But there is another new wrinkle in the regulations this year designed to give the waterfowl a more decent chance when the first gun is fired by our army of hunters next fall.

You all know how it is -- or how it has been -- with our army of hunters starting out before sun-up to beat one another to the ducks. Well, the bird protectors figure that is neither fair to the ducks nor to the duck hunters who have to go farther to get to the hunting grounds.

Ducks and other waterfowl soon get wise and wary, but it has never been established for certain that they really read the regulations as to when the season opens. Many are caught by surprise in the cold, gray dawn when the hunters unlimber their artillery.

This year, however, they will get a shade better break. On the morning of the first day, the birds may have their breakfast in peace. Under the new regulations, the hour for the commencement of hunting on the opening day of the season will be 12:00 o'clock noon. The firing the first day may give notice of what is coming next morning.

Another new regulation is designed to make wild goose hunting more of a sporting proposition. In hunting these birds not more than ten live goose decoys may be used or shot over at any one gunning stand or blind or floating device.

However, all the changes in the migratory-bird regulations don't have to do with waterfowl. There are also new rules in regard to hunting mourning doves. Although mourning doves don't really mourn, the unfair scheme of

baiting fields for them has made countless thousands of real sportsmen mourn. It has resulted in a tremendous slaughter of these birds, which are easy enough to kill as it is. In many sections of the country, hunters have fallen into the practice of getting farmers and others to bait fields for doves. Then when the hunters gang around the field, they find it a little too easy to exceed the Federal limit of twenty-five, and are often tempted to try to stretch the bag.

In order to protect the dove supply from such a menace, under the new regulations this year the hunting, killing, or taking of mourning doves is not permitted on or over, at, or near any area that has been baited with salt, with corn, wheat or other grain, or with other foods placed or scattered thereon.

The most striking changes in the Migratory Bird Treaty Act Regulations for the coming season, as Mr. Sheldon points them out, are five in number: First, the seasons are shortened on migratory waterfowl fifteen days; second, on the opening day hunting may not begin until noon; third, a limitation is prescribed on the use of live goose decoys; fourth, it will be unlawful to hunt mourning doves around or over baited fields; fifth, all shooting of migratory waterfowl will be unlawful anywhere in the United States after the middle of January and at any time during the month of September.

Of course, there are a number of other regulations with which you hunters should be familiar. However, if you want more detailed information about the Federal hunting laws you can obtain a copy of the regulations by writing to the Office of Information, United States Department of Agriculture, at Washington, D. C.

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CLOSING ANNOUNCEMENT: Our Wildsman has just outlined a few of the striking changes in the Federal game bird laws this year. This outline is presented to its listeners by Station_____ as part of its plan of cooperation with the United States Department of Agriculture.

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UNITED STATES DEPARTMENT OF AGRICULTURE

Radio Service

OFFICE OF INFORMATION

APR 13 1931

U. S. Department of Agriculture

In 3 C w

CHATS WITH THE WEATHER MAN: Friday, April 17, 1931.

NOT FOR PUBLICATION

Speaking Time: 10 Minutes

ANNOUNCEMENT: Shakespeare makes his fairy, Puck, say; "Ill put a girdle round about the earth in forty minutes." That is certainly a swift flight of fancy! But what the United States Weather Bureau actually does in "forty minutes" is not so slow either! Listen to this ---- Well, Mr. Ob. Server? -----

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Speed is the subject of my story.

A lot of us think we know something about the weather. But Mr. E. B. Calvert, chief of the forecast division of the United States Weather Bureau, says that even many of us "weather cranks" don't appreciate what the Weather Bureau has to do to collect its observations for the use of its forecasters, quickly and completely.

Telegraph, telephone, cable, and radio are used.

Our Weather Bureau maintains 210 stations in the United States, where observations are made twice a day and promptly telegraphed to the district forecast centers and to other stations.

Similar observations are received from 64 Canadian stations, and from 16 in Alaska, and, during the hurricane season, observations are received by cable or radio from 21 stations in the West Indies and Central America, twice a day.

Observations from all these points are filed at approximately 8 o'clock Eastern Standard Time and, with the exception of very few outlying West Indian islands, all these observations are received at the forecast centers and other stations using them within one hour's time.

In fact, Mr. Calvert says, 90 per cent of the observations are received and charted within the space of 40 minutes.

That means the filing, and transmission, and delivery of about 15,000 messages inside of an hour. That is 30,000 messages each day during the two hours, morning and evening.

From the 210 stations in the United States, the messages are shot into one of the two distribution centers, Chicago and New York. From Chicago or New York each of those messages is wired out again to the number of stations designated to receive it. For forty minutes to an hour twice each day, weather messages rush over the wires in a continuous stream.

The 16 Alaskan station reports are collected by radio and sent by cable to Seattle and then forwarded by overland telegraph to Chicago.

The 64 Canadian reports are collected at Toronto and forwarded by telegraph to the two centers at Chicago and New York and distributed in the same manner as the reports from United States stations.

At Chicago 25 telegraph employees, and at New York 15, do nothing but handle Weather Bureau messages during these regular twice a day periods. As each message comes in, it is quickly passed to duplicators who copy it on ready-addressed and prepared forms for all stations which are to receive it. In some cases 60 other stations are to get it, in others 80, in others 100 or more. Messenger boys on skates snatch up the copies as they are prepared and whizz them to the telegraph operators who wire them out again to the many stations.

A single example will give you some idea of the speed of all this. Mr. Calvert says he has checked up on this many times. A message is filed in, say Abilene, Texas. In from four to seven minutes after the weather message is filed at the Abilene office, it has already been received at Chicago, and wired out again to the 140 other stations designated to get that particular report ---- How do they do it!

Of course, those messages are in code. The code is not for secrecy. It is for speed and economy. The average length of those 30,000 messages a day, is only six code words. But at that, those messages mean the sending and receiving of nearly 180,000 weather words each day.

If a code was not used, it would take an average of about fifteen words to convey the same information in plain language, or about 2½ times as many words. It would not only cost more and take more time to send those 450,000 words a day, but it would actually take tremendously more time to scan the messages in plain language than it does to decode. The messages as now received can be translated by our Weather Bureau men as fast as a man can talk.

Here is one of those messages as it actually came over the wire in code. See what you can make of it:

JERSEY NUGGS DIFFORM TOGGING GASSING KINDLE WABASH CLODDYS VERMALEY

Sounds like a senseless jumble of meaningless words doesn't it.

Yet the Weather Bureau men readily read that message as saying, "Atlantic City, New Jersey, the barometer reads 29.50, and the temperature forty. The wind blowing from northeast, state of the weather raining,

lowest temperature during the night thirty-eight. At 8 P.M. of the previous day the pressure was 29.98 and maximum temperature yesterday forty-eight. The wind blowing forty two miles an hour, with .86 inch precipitation during the preceding 24 hours. Pressure falling, fell.04 inch in preceding 2 hours. Thunderstorms began during the hour preceding the hour of observation and continuing at the time of observation. Few nimbus clouds moving rapidly from the northeast. Maximum wind velocity since previous observation of fifty two miles an hour from the northeast."

All those facts and figures told in nine code words! Do you wonder they use code?

To the weather man, the position of those code words is the chief guide. He knows the first word stands for the name of the sending station. The second word gives the barometer and thermometer readings, the third word direction of the wind, and so on. The same word in a different position would be translated as covering some other phase of the observation.

The United States used a word code, because words lend themselves more readily to the detection of errors and because words are more economical than groups of figures would be. Groups of five figures, for instance, can be sent by cable or radio as one word, but under the system of telegraph charges in this country, each figure would be counted as a separate word.

In Europe, however, the system is different, and the European meterological services use figures to represent the weather data upon which forecasts are based. The figure-codes are a little shorter, but more liable to errors than the word code.

But the different countries of Europe had different figure-codes. For years it was recognized that there should be an international code so weather reports could be plainly read by all nationa. It was readily seen that for international reports, it would be impractical to use words. Not only would nations fail to agree on the words but to use words from any language would require some knowledge of the language used by everybody concerned. A figure code was essential,that was agreed. But the difficulty was in getting nations to agree what data should be included in the code and the order or arrangement. Last year at Copenhagen, Denmark, Mr. Calvert represented this country at a conference of the world's meterological services which finally agreed on an international weather code. Now all international exchange of weather reports between this country and Europe, and between the various countries of Europe, and between vessels in the Atlantic and Pacific is in the international figure code.

When the Graf Zeppelin flew around the world a couple of years ago, she was forced to take 31 different weather code books to read the needed weather news.

If she took the same trip now, she would need only two code books, one for land station reports, and one for the ship reports.

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ANNOUNCEMENT: You have just heard a discussion of weather codes and the other speedy means by which observations are gathered from all over the country in the remarkable space of forty minutes. This chat with the weather man comes to you from Station _____ in cooperation with the United States Department of Agriculture.

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UNITED STATES DEPARTMENT OF AGRICULTURE

Radio Service

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MAY 4 1931
U. S. Department of Agriculture

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WITH UNCLE SAM'S NATURALISTS. Friday, April 24, 1931.

(NOT FOR PUBLICATION)

Speaking Time: 10 Minutes.

ANNOUNCEMENT: This is the day for another of our little adventures into the wild. Our Wildsman has been on another of his visits with Uncle Sam's naturalists of the U. S. Department of Agriculture and again bring us word of some of the recent findings about our wild life. Well, Mr. Wildsman?

--oo--

Listen! I want you to hear a story of wild life, as told to the accompaniment of the "murmuring of innumerable bees."

Maybe you don't think of honey bees as wild -- that is, unless you have recently had that fact thrust upon you by a bee itself.

Bees have been associated with man for thousands of years. They were probably among the first things to add sweetness to the hard life of our prehistoric ancestors. Certainly, they have been handled and used, and, in a measure, controlled by man since the dawn of history.

We generally think of them as among our domesticated livestock Their remarkable social life and industry have been extolled in song and story for ages. Yet, in spite of all that and in spite of the handling, and all the association with man down the ages, Mr. J. I. Hambleton, in charge of the bee culture laboratory of the United States Department of Agriculture, says that honey bees are still untamed. They are just as wild as they ever were.

And when the time comes to swarm, no matter how many model homes the beekeeper may provide for them, they will head off to the woods. On the other hand, you can go into the woods, discover a bee tree, capture the bees and put them in a hive of your own choosing, and in a few days they will be happily and contentedly at work.

Go into the woods in most any part of this country, and you will find bees living in the wild. Yet when the white man first came to this country, Mr. Hambleton says, there was not a honey bee anywhere in all America. The ancestors of all our wild honey bees were brought over from the Old World. The Indians called them "the white man's flies."

Mr. Hambleton and his assistants have studied the habits of this wild livestock of ours for years. And from what he says it seems that the individual honeybee under two weeks old, that is, the nurse bee, is not such a model of

industry as is the old field bee. The duty of the field bees is to gather nectar and pollen, and this they do with everlasting energy from the first break of dawn until the last rays of the setting sun. The duties of the nurse bees are many and, strangely enough, no one nurse bee seems to finish any job it starts. It will start one thing, then switch off to something else, then go on to another job. The nurse bees as individuals apparently work in a haphazard way that would be the despair of any efficiency expert. The marvel, however, is that for all these, what most of us might call "slipshod methods," the work of the hive goes smoothly on with perfect harmony at all times. Traffic jams caused by many bees wanting to do the same thing at the same time are unknown. It is only through the marvelous perfection of its organization that a colony of bees can gather the nectar from the countless flowers and convert it into honey, a food which is as good as it is old, and which has graced the tables of our forbears since the creation of time.

But in slack seasons, our famous busy bees easily acquire the habit of stepping from the straight and narrow path of honest industry. They turn robbers. Bandit bees from strong colonies force their way into the hives of weaker colonies, and overcome the guards at the door, drive out the weaker bees, and seize their stores.

Mr. Hambleton was also telling me of a bee-keeper who went away and left a little honey house filled with honey in his yard. Knowing that bees will find their way even through a key-hold, he stopped up the key-hole. It was still stopped up when he got back, but when he opened the door, the honey was gone. The mystery was soon solved. The bee burglars had entered by way of the chimney. That shows you what a keen sense of smell bees have.

In fact, their sense of smell seems to be the bee's main reliance inside the hive. The guard bees at the hive entrance are able to detect the undits by their odor. That is not because robbers are in bad odor, but because each bee colony has a distinctive smell readily recognized by the bees from any other colony. And the queen bee, who is virtually a prisoner of the workers rather than the head of the government, has an odor peculiar to herself. In fact, these various odors are apparently highly important in determining the instinctive reactions of the bees in the hive. There is no head, no boss, no ruler; but take away the queen, and the change is promptly discovered by the change in odor within the hive.

However, don't imagine that bees rely altogether on their sense of smell. Their sense of sight seems to be highly useful in hunting for the flowers from which they get the nectar and pollen which they carry to the hive.

Mr. Hambleton says that experiments performed at the bee culture laboratory show that bees have a very marked sense of color, which is remarkably like our own, within the range of colors our eyes can see. But bees can see beyond the range of human eyes. Within our visible range, they prefer the yellow-green as we do. But they can see ultra-violet light rays we can not see. Since many flowers reflect ultra-violet light from their surface, Mr. Hambleton holds that the bees' ability to see in the ultra-violet may be an important guide to them in selecting flowers for their nectar supply.

However, our honey bees today probably respond in all things just as they did ages ago. Man hasn't changed them a bit by working with them.

That, Mr. Hambleton says, is because man has had no control over their mating, as he has with other animals.

Bees do a remarkable job, but bee-keepers can see where improvements in these children of the wild would be highly desirable. For instance, an improved model bee might be one with a wider wing spread, and a more strongly muscled thorax; one built to fly farther and carry heavier loads of pollen and nectar at each trip.

After the worker bee has passed through the various stages of its apprenticeship at the various classes of work inside the hive, its life as a field worker is only about four weeks. Longer-lived bees might prove an advantage.

Then every bee-keeper would like to get hold of bees more resistant to the diseases which sometimes sweep through colonies and cause heavy losses.

And, of course, there is the matter of disposition -- most any bee man would like to see improvements in the disposition of bees.

It is not that there are not differences between different races, and colonies, and individuals, in all these respects. For instance, some races are much easier to handle than others. Others are more aggressive. And it has been long noted that hybrids are more aggressive than either of the parent stocks.

The trouble has been in getting the wild drones and the wild queen bees to mate in captivity. Effort after effort to do selective breeding by control of the wild nuptial flight has failed.

I say that has been the trouble. About three years ago, however, a bee scientist, formerly employed by the United States Bee Culture Laboratory, discovered a means for the artificial fertilization of queen bees.

That discovery, Mr. Hambleton says, gives a key to the hitherto puzzling problem of bee improvement. It may be many years before the experiments with this new method reach a point where their results can be applied by the average bee breeder. But at last, after untold centuries of work with honey bees, there seems to be some prospect that we may really domesticate the wild honey bee.

CLOSING ANNOUNCEMENT: You have just heard a discussion of the untamed honey bee. This talk with Uncle Sam's Naturalists is presented by Station_____ in cooperation with the United States Department of Agriculture.

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UNITED STATES DEPARTMENT OF AGRICULTURE

Radio Service

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U. S. Department of Agriculture

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CHATS WITH THE WEATHER MAN. RELEASE Friday, May 1, 1931.

ANNOUNCEMENT: And now for our chat with the weather man! --- Weather is a subject that's always fresh --- as fresh as the dew on a bright May morning --- Let's listen to what our old friend Ob. Server has to say about the work of the United States Weather Bureau --- and other weather services around this old world of ours ------- Well, Mr. Ob. Server? -------

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I guess most all of us have swapped weather talk with the neighbors at one time or another.

That's what I want to talk about; swapping weather reports.

I venture to say a lot of you traded observations on the weather this morning. Maybe you ran across a friend from another part of the county, and compared notes on the weather. Or maybe it was with your next door neighbor.

Well, from what Mr. A. J. Haidle, of the forecast division of the United States Weather Bureau tells me, nations do something of the same sort. Only it is not casual exchange of information, at odd times, in chance encounters, as it is with most of us. Nations swap weather talk with neighbor nations as a regular thing every day and in a systematic way. The United States, for instance, gives other nations the reports on our conditions, and we get their reports in return. In that way, we get weather observations every day from all around the world.

Every day, Mr. Haidle draws a weather map of the entire Northern half of the world based on our observations and those we get from other countries by cable and radio. And on this subject of weather, nations are very neighborly. Each helps the other and is in turn helped by the weather information it gets, in return. While our Weather Bureau prepares this world-wide map from which our forecaster interprets the general weather outlook in this country for a week ahead, other weather services are making similar maps of world weather conditions for their forecasters.

For instance, Mr. Haidle showed me the map he had made on a certain day on the basis of reports from this and other countries. We then looked

up a similar map of the entire Northern Hemisphere as drawn that same day by the German meterological office in Hamburg, Germany. We laid those two maps, drawn the same day one in Washington, and the other in Hamburg, side by side. They were almost exactly alike. The general areas of clear weather and the centers of storms, the "Highs" and "Lows" with those attendant lines circling about them had been accurately located by the different map makers working thousands of miles apart.

Of course, the Herman weather map men had European conditions shown in a little more detail, because they get more observations in Europe than are considered necessary to send in the trans-oceanic exchange of weather information. On the other hand, our Northern Hemisphere weather map shows conditions in the United States with a little more detail.

In the main, however, the exchange of observations gives each of the world's chief meterological services the information by which its experts can chart a practically complete and accurate picture of weather conditions the world around.

Here is how the swapping is done:

Twice a day, at 11 A.M. and 11 P.M , our United States Weather Bureau sends direct to Paris by radio a selected set of some 75 weather reports from the chief weather stations scattered throughout the United States, Canada, Alaska, Greenland, and the West Indies, and from ships at sea in the North Atlantic west of 35 degrees and in the Pacific Ocean. At Paris, those reports from this side are rebroadcast from the Eiffel Tower, and picked up by such of the twenty-two meterological services of Europe as do not copy the bulletins direct. Many of them do. The reports are used in forecasting and weather study by the different countries.

A similar collection of reports on European conditions has been assembled at Paris and forwarded from there to this country by radio. Recently, however, it was found that better reception could be obtained through the British Meterological Office and the Rugby, England, radio station.

So now, twice a day, at 9 P.M. and 10 A.M., Greenwich Mean Time, the weather reports covering conditions over Europe, northern Africa, parts of the Union of Socialist Soviet Republics, and Asia, and the North Atlantic ocean east of longitude 35 degrees, as recorded at 36 weather stations of different nationalities, are gathered by the British Meterological Office at London and forwarded to this country through the British radio station at Rugby.

Mr. Haidle says that reports from stations along the river Nile in Egypt and on the Red Sea are now included among those used in making the daily chart of the Northern Hemisphere at our United States Weather Bureau.

Next year, through the courtesy of the Portugese government we may get several reports from the Cape Verde Islands off the west coast of Africa. That report will be forwarded by way of Lisbon to the Azores by radio, and then cabled directly to Washington, and Mr. Haidle estimates that it may prove

of immense value in forecasting the approach of tropical hurricanes. The Cape Verde Islands are near what is considered as practically the birthplace of many of the tropical storms which sometimes sweep our South Atlantic and Gulf coast.

On the other side of the world, we also get a number of observations used to make up our world-wide weather map. Ships following the Great Circle route along the coast of Alaska to Japan and China send in reports. And of course, we get reports from Hawaii and Guam and the Phillipines. And a series from Japan and this weather service reaches even into the center of China.

In fact, if you could glance at the chart as Mr. Haidle draws it each day, you would see that we now have a practically complete weather map of the Northern Hemisphere except for parts of northern Russia and Siberia. Of course, a lot can happen to a storm moving across the vast stretches of the Pacific, but Mr. Haidle tells me that observations made in the eastern Asia often give our forecaster good tips as to what is coming our way in the way of weather.

As you know, the general movement of storms in the Northern Hemisphere is usually from west to east. What is coming to the west of us is highly important to our forecasters. And so it is with the nations of Europe. That is one big reason our weather reports are so important to them. What we are getting shows their forecasters what they may expect. Then too, many of the countries of Europe are so small, it is necessary that they have reports from other countries in order to get <u>any</u> advance notice on storms at all.

In regard to the weather, we are all neighbors. All nations find it to their mutual advantage to be neighborly and swap information on that very vital subject, the weather.

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<u>ANNOUNCEMENT</u>: Once every two weeks, this Station ------ presents these chats with the weather man. The information comes direct from the United States Department of Agriculture of which the United States Weather Bureau is a part.

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UNITED STATES DEPARTMENT OF AGRICULTURE

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WITH UNCLE SAM'S NATURALISTS RELEASE Friday, May 8, 1931

NOT FOR PUBLICATION

Speaking Time: 10 Minutes.

ANNOUNCEMENT: As wise King Solomon once sang, "the winter is past; the rain is over and gone; the flowers appear on the earth; the time of the singing of birds is come, and the voice of the turtle-dove is heard in our land." To-day our Wilds Man is going to tell us about how Uncle Sam's Naturalists keep track of the comings and goings of birds; big ones and little ones, tame ones and game ones, singers and squawkers----Well, Mr. Wilds Man?----

---oOo--

With all the folks who are flitting around in automobiles these days, it is a big enough job to keep up with our migratory humans.

But just think of the job of keeping track of our more than four billion birds! ---Even in a general way.

There are more than seven hundred different species of birds, to say nothing of the sub-species, in this country. Some are strong, swift flyers, other are slow, clumsy flyers; but they all have wings; and most of them move about, more or less, from place to place.

Of course, you know, there are birds like the cardinals that seem to stay all their lives within a few miles of the next in which they were hatched. But even our old friends the mourning doves move about from State to State, and so do the robins, and the wrens, and the swallows, and scores upon scores of others. Many of our ducks and geese nest in Alaska and Canada.

Right now we are in the midst of the season of heavy traffic in our air lanes, as the hundreds of different kinds of birds are winging their way to their summer homes.

For many years, now, the United States Biological Survey has been studying the migratory movements and geographic distribution of birds----"What difference does it make?" you say.

"May be there are a few more of some kinds this year in our yard or in the neighboring fields or woods. Or may be there are fewer of other kinds.-- "What difference does this make?"

Of course, you are not thinking of our food and game birds when you ask that. How they are doing on other parts of their range may have a whole lot to do with your hunting next season.

But just where do the different birds come from? And where do they go? Some birds are disappearing in certain sections. Others are coming in. And remember, many of those birds filling the air with music around your place may also be filling their little stomachs with the insects that damage the crops. Others may be feasting on your best fruit. Does this kind need protection?

There are a thousand and one questions you might ask. Some birds at times are a liability. Taken by and large, however, the birds of this country, and those that summer here, and nest farther north, and those that merely pass through are a tremendously important asset, estimated to be worth millions of dollars annually.

As I said, the United States Biological Survey keeps track of the past and present ranges and distribution of birds, from the totally extinct passenger pigeon and the greatly reduced wild turkeys to such newcomers as the fast-spreading starling that was brought here from Europe a few decades ago.

There are some 500 volunteer bird observers who make regular seasonal reports to the Biological Survey on the different species as they show up in their communities. They report the date when the first bird arrives in spring, and when that kind of bird becomes common. What time the same kind of bird first appeared in other seasons and whether or not it breeds in that section are also noted upon the record.

From the record of these volunteer reports and from the literature on the subject, the distribution of practically all the more than seven hundred species has been mapped, with a separate map showing the range of each species in this country and, in many cases, the range over the entire continent. Many of these reports come from Alaska and Canada and some from Mexico and other countries to the south.

In addition to those records, the United States Biological Survey has hundreds of thousands of cards recording migration reports from its 1800 authorized bird banders. Each year, these 1800 volunteer workers are permitted to trap all sorts of birds, place little numbered aluminum cuffs or bands on their legs, and then let them go again.

This doesn't hurt the bird. The light aluminum marker is little if any inconvenience. Very many of these banded birds fly away and are never heard of again.

Each of these bands, however, has upon it the words "Notify U. S. Biological Survey, Washington, D. C." In case anyone finds a banded bird, dead or alive, he is requested to report the band number and the place where the bird was found.

Naturally, many of the reports are sent in by hunters who have killed the birds. But the records of the Biological Survey contain reports of birds that have met their end in many peculiar ways. Some are killed by storms, others are killed by automobiles. One sea gull was killed by a golf ball. That golfer made a "birdie" all right!

When a banded bird is reported found, the number is looked up on the cards and in a moment it can be determined just where the bird was banded, and the exact date on which it was released and by whom. In this way, Uncle Sam's naturalists are gradually accumulating many important facts about bird movements to and from their feeding and breeding and wintering grounds.

Several years ago, an expedition was sent into the Yukon region of Alaska to band ducks and geese on their breeding grounds. Later by means of the recovered bands from birds killed by hunters, the travel routes of these waterfowl across the open sea to British Columbia, Washington, Oregon, and to feeding grounds in California was clearly traced.

Ducks banded on the marshes of the Bear River Migratory Bird Refuge in Utah, have been recovered at so many widely separated points as to prove that region to be a concentration point for the waterfowl that go to states in all the surrounding region.

In like fashion, the routes followed by many other birds have been discovered. A chimney swift banded one fall in Georgia was taken next June in New Hampshire. A robin banded in Minnesota was taken more than a year later in Mexico. A common tern banded in Maine was found on the west coast of Africa. A great blue heron banded in Minnesota was killed in Panama.

In the past ten years, by means of bird banding, we have learned more of the travel routes followed by the different birds than ever before. But it will take many years more to solve many of the migration problems.

And there still remains the great mystery as to what controls the going and coming of birds and how it is that some birds will come back to the same orchard and the same tree year after year.

However, migratory birds do occasionally get lost. Some wander off their course. And the accidents to bird traffic sometimes become terrible disasters. Recently, a storm in Wyoming destroyed thousands of birds. Lights often lure birds off their course, and hundreds sometimes destroy themselves in their confusion around light-houses.

And the less spectacular traffic accidents also take a tremendous toll. In ever increasing numbers, the U. S. Biological Survey men report accidents between our gourist automobile traffic and slow flying birds. Thousands of birds are killed by automobiles each year. Some of these accidents are unavoidable, but Uncle Sam's naturalists seem to think that many such fatal accidents could be prevented by more thought for the birds on the part of motorists. Let's give the birds a chance.

--oOo--

____ ANNOUNCEMENT: Station_____presents this feature, "With Uncle Sam's Naturalists once every two weeks. This talk gives us a close-up on some of the work being done by the Biological Survey of the United States Department of Agriculture.

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CHATS WITH THE WEATHER MAN

RELEASE Friday, May 15, 1931.

NOT FOR PUBLICATION

Speaking Time: 10 Minutes.

ANNOUNCEMENT: Your old friend, Ob. Server, seems to be all up in the air. He has been having another of those chats with the weather men of the United States Weather Bureau.---I guess it must be what they told him, that started him up---- How about it, Mr. Ob. Server?-----

---oOo---

Yes, Mr. Leroy T. Samuels, of the aerological division of the United States Weather Bureau, has been telling me about how our weather experts find out about conditions in the upper air.

By "upper air" we mean anything from 65 feet above ground on up as high as there is any air. Of course, they haven't got the records that high yet; but it is surprising how high they have gone in some cases.

It is not such a simple matter to get the plain facts about the temperatur and the humidity, and the speed and direction of the wind way up aloft there.

I guess the first man to make "upper-air" observations was some fellow lying on his back watching the clouds go drifting by. The clouds give a simple means of getting the direction of the wind at the level where they are.

Of course, our weather experts have improved on that system of watching the clouds. They have an instrument which is chiefly a black mirror mounted on a level stand out in the open where the mirror will reflect as much of the sky as possible. The motion of the image of a passing cloud seen in the mirror shows the direction the cloud is moving; that is, the direction of the wind. That mirror is mounted in a frame marked in degrees, and there is a movable sighting device, and Mr. Samuels tells me that if they know the height of the cloud, they can easily compute the speed with which it is moving, from the distance the cloud image moves across the mirror in a given time.

But that brings up the question; How are you going to know how high the cloud is?

Well, did you ever see a toy balloon get away from a baby on the way to the circus? --- Anyhow, as you may know, the weather men at our commercial air fields let loose little balloons to find the height of the clouds or "ceiling" for air travel. The balloons are inflated to a certain size and rise at an even rate. It is merely a matter of following the balloon with the eye and timing it until it loses itself in the clouds to get a good estimate of the height of the clouds.

Ceiling balloon observations are rather recent developments for practical use when clouds are low. On the average, those balloons are watched until about a half mile up. The record ceiling balloon observation in this country is two miles up.

But suppose there are no clouds? How are you going to tell about the speed and direction of the wind when there are no clouds? and at the levels where there are no clouds?

The so-called "pilot" balloon observations take care of that. In those observations, wind direction and velocity is determined by watching small balloons through telescopic instruments much like a surveyor's transit. The balloons are inflated to a certain size and lift as determined by "weighing" on special scales. Barring leaks, it is known from tests that those balloons will rise at a certain even rate, per minute. By keeping the instrument sighted on the balloon and reading the angles from minute to minute, our surveyors-of-the-wind get the data needed to find the horizontal speed at which the balloon and wind which carries it move.

On the average, pilot balloons get the wind facts up to three miles high. In unusually clear air, the powerful little magnifying instruments have followed them a horizontal distance of 40 miles. The record height reached by a pilot baloon in the United States is about 21 miles. The world's record is 24 miles up.

----All very well for the wind, you say? How about the temperature and humidity way up there?

Well, our weather men get those records too.

To do it, they use sounding balloons, which are about twice the diameter of the pilot balloons. The sounding balloons carry automatic devices for writing a record of the temperature and humidity, and pressure of the air through which the balloon passes.

Mr. Samuels showed me one of those clever little instruments. I wished you all could see it. The contraction and expansion of a little piece of metal attached to a pen draws the record of the temperature. The humidity record is made by a few human hairs which stretch or shrink a wee bit according to the moisture in the air. In so doing, they move another pen. The paper wound on a cylinder moves slowly past the pens by means of clock-work.

Mr. Samuels says the average height reached by sounding balloons is nine miles. The world's record is 22 miles. That's rather high, and awful cold. At around 130 degrees below zero, any ink would freeze, so smoked paper is used to ta the tracings, which show the ups and down of temperature and moisture in the air.

These sounding balloons expand as they rise and finally burst. The records are brought down by parachute. That is one of the best ways of getting records of extreme heights. One trouble with it is in recovering the instruments and records; especially in rough country.

In order to get similar records for practical every-day knowledge of the

air at lesser levels, and get them promptly, our weather men use captive balloons and kites which carry the recording instruments. On the average, they get records of conditions up to two miles above the earth by kites and by captive balloons. The record for captive balloons is 2½ miles up, while records have been obtained in this country with kites up to 4½ miles.

But as you may know, big balloons carrying men have gone much higher than that. In fact, weather records have been obtained in free manned balloons up to more than 8 miles high. Of course, sending men up in free drifting balloons would be too expensive and uncertain a thing for regular weather observation.

However, airplanes carrying weather recording instruments have gone more than 8 miles high, even higher than manned balloons. Airplanes can and are being used to get day by day records of the weather conditions at different lower levels most important for forecasting conditions along our air-ways. In fact, Mr. Samuels tells me that even now airplane observations are being substituted for some of the kite station observations. The United States Weather Bureau is contracting with air-men to make regular daily up and down trips, which can get the weather facts much more quickly than kites can be flown to the desired heights.

Another promising method being tried out in France by the French meterological office, is the use of radio sounding balloons carrying light, automatic short-wave radio-telegraphic transmitter whereby signals giving indicati of pressure and temperature may be received on the ground while the balloon is going up. That method gives the weather men on the ground almost immediate knowledge of the conditions through which the balloons pass.

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ANNOUNCEMENT: You have just heard something of how the United States Weather Bureau and other meterological services reach for facts in the upper air. Station _____ will present another chat with the weather man, two weeks from to-day.

UNITED STATES DEPARTMENT OF AGRICULTURE
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WITH UNCLE SAM'S NATURALISTS Friday, May 22, 1931.

ANNOUNCEMENT: And now for a visit with Uncle Sam's Naturalists. Our Wilds Man has heeded the admonition of Solomon to "go to the ant, thou sluggard, consider her ways and be wise." He has been to the specialists of the United States Department of Agriculture who know the ways of the ant ------ Well, Mr. Wildsman!

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Most of us renew our acquaintance with ants about this time of the year.

Some of the ants may join you at a picnic spread. Others may not permit you to rest on a log in the woods. You notice the mounds of still other kinds right in your path, or your brickwalk, or your lawn. You discover a thin red line streaming across the pantry shelves toward the sugar bowl.

It is very evident that we have a lot of ants, a lot of different kinds of ants, found in a lot of different places.

We have a lot of ants right in many of our houses. In some cases, they get so bad and do so much damage folks just have to move out.

Dr. E. A. Back, head of the division of the United States Department of Agriculture which deals with household insects, tells me that practically all our house-ants came from the tropics. That's why they take to houses, to keep warm in cold climates. Ants have shipped as stowaways on trading ships to all parts of the world. The Argentine ant, which does so much damage in the South, probably came on coffee ships to New Orleans from Brazil. The little red ant known as Pharaoh's ant crossed the seas so long ago nobody knows just where it did start from. Most of our house ants came from the Old World, however.

Once on land, they naturally spread only a few hundred feet each year, although sometimes ants are carried considerable distances by winds. But one of the chief ways of getting around from place to place is in our "side-door Pullman" and by other means of hitch-hiking.

Of course, we have native North American ants. But they are more out-door ants, though sometimes some of them will make raids on dwelling house larders. That is, most of them are outdoor ants. The little thief ant of our Northern and Eastern States is a true house pest.

The little thief ant is not as much of a pest in human habitations as it is in the homes of other ants, however. Thief ants come by their

name honestly, but that seems to be about all they get honestly. They have a habit of living in the walls of the underground hall-ways and rooms which form the homes of other and larger ants. The little thieves move about freely and kill and eat the young of the bigger ants. The passages into the thieves quarters are so small, the bigger ants can't get through them.

But evidently, thief ants were not the kind King Solomon was thinking about when he gave his famous advice to lazy humans.

I guess most of us think of the busy bees as being the last word in social organization; but as Solomon knew some of the ants have a more marvelous and more highly organized society than you find in a colony of bees. Like honey bees, ants have distinct castes, and divide up the work, and all work together in the most perfect harmony and accord. The ants you ordinarily see in houses are the neuters or worker ants. The ant colony has big wingless female or "queen" ants, and at times produces the winged male and female ants which almost immediately take their nuptial flight. The males soon perish, and the females tear off their wings and set about to establish new colonies in much the same way as does the queen bee.

Our common American lawn ant, a dozen mounds of which you can often see in one square yard of lawn surface, is not only a lawn pest, and sometimes gets into the groceries in the kitchen, but also has an interesting habit which often causes considerable damage in the flower and vegetable garden.

That is, those common American lawn ants keep "cows" and pasture them on the plants. Their cows are the aphids or plant lice which suck the juices from the stems and roots of the garden plants. The ants actually get that juice or "honeydew" by practically "milking" those other insects. That is, the plant lice let them stroke them, and when they do, the plant lice give up the honeydew to the ants.

What's more, the entomologists tell me, the ant herders protect the aphids and drive away predatory insects. They keep aphids penned up, and carry them and put them on the roots of plants. They take them to pasture, as it were. And the ants remove the earth from the surface of the roots and build runways around them, so the aphids will be able to get to their forage readily.

Some ants often build little sheds of earth to protect their cattle. The ants care for the eggs of the aphids over winter, shifting them about, as they do their own young, from upper to lower rooms according to changes in temperature and moisture in the ground.

All that is mighty nice for the ants and aphids -- the ants get the surplus honeydew food and the aphids get the care and attention, but it is not always so good for the plants.

There are other kinds of ants with other activities just as interesting. No wonder Solomon was fascinated by their industry. Ants have been a fascination to many men; and an exasperation to many more.

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There are ants in our Southwest which harvest mature grass seed, carry the seed to their nests, remove the husks, and store the edible kernels in granaries for future use. The chaff is cleared away; for all ants spend a good bit of time keeping their homes and themselves clean and in sanitary condition.

But those harvester ants don't seem so wonderful to us, as those gardener ants. Yes, sir, there are actually ants which raise low forms of plant life kin to mushrooms and molds. They plant the garden, prepare the soil, keep out the weeds, and eat the products of their own gardens.

The queen ant starts the underground garden, but the workers carry it on. They bring in leaves, and other substances which they find suitable for manure for the new garden. The job of weeding the garden falls to the smallest workers -- as some small boys claim it does in some of the gardens of our humans in the suburbs. These so-called "mushroom gardens" are really cultivated. The fungus grown develops large heads not found outside the ants' gardens.

Well, entomologists can tell you even more wonderful things than these about ants. There are "soldier" ants, which can't even feed themselves, but which fight and capture other ants and force them to work as their slaves. But we can't go into all the different stages and types of ant society.

Anyway, some of my more practical friends are saying; "That's all right but how do you get rid of the pests?"

I can best answer such questions by just referring you to some first-rate bulletins on the subject. There is one called "House Ants, Kinds and Methods of Control" which it is well to have handy. It is Farmers' Bulletin No. 740. Remember the number, 7-40. And by the way, those bulletins are free as long as the supply lasts. There is a special one on the Argentine ant which does so much damage in the South. It is called "The Argentine Ant as a Household Pest," and is Farmers' Bulletin No. 1101. And there is also one on termites or white ants. Termites are not really ants at all, the entomologists tell me, but they live and act a lot like ants, and do a tremendous amount of damage to the foundations and woodwork of buildings throughout the United States. "Preventing Damage by Termites or White Ants" is Farmers' Bulletin No. 1472.

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ANNOUNCEMENT: You can get those bulletins by writing either to this station or by writing direct to the United States Department of Agriculture. I'll repeat the names and numbers. "House Ants, Kinds and Methods of Control" is Farmers Bulletin No. 740. "The Argentine Ant as a Household Pest" is Farmers Bulletin No. 1101, and "Preventing Damage by Termites or White Ants" is Farmers Bulletin No. 1472.

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UNITED STATES DEPARTMENT OF AGRICULTURE

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WITH UNCLE SAM'S NATURALISTS. RELEASE Friday, June 5, 1931.

NOT FOR PUBLICATION

SPEAKING TIME: 10 Minutes.

ANNOUNCEMENT: Here is a talk with teeth in it! The tearing teeth of coyotes, and wolves, and mountain lions, and bobcats! Uncle Sam's naturalists in the U. S. Biological Survey have pointed out to our Wilds Man some of the activities of predatory animals.----All right, Mr. Wilds Man, Shoot!---------

--oOo--

Listen, folks!

You may hear the faint echoes of the howl of the wolf, or the coyote, or the bobcat before we get through.

I take it, you folks love nature, and the wild life in the big outdoors. But beneath all the beauty, there is a fierce struggle for existence, with one kind of animal often preying upon another.

Since long before the dawn of history, bobcats, coyotes, wolves and mountai lions have pulled down victims in plenty. Sometimes their pickings were lean, bac in the old days.

Then along came man with his flocks and herds and other domestic stock.---To many a hungry wolf it may have seemed like a dream of a wonderful banquet come true---a happy hunting ground in this world. With a readily available supply of food to be preyed upon day after day and night after night, what could be more natural than for the predators to turn to it?

Of course, our pioneers and early ranchers resisted---they had no choice. They had to fight the predatory animals as best they could. The prowlers grew more wary, but kept up coming to the feast that was theirs for the taking. Guns, and traps, and poisons were used against them, but the predators flourished and multiplied.

Well, you know the story of advancing settlement and crowding back the frontier.

In some of the more thickly settled parts of the country, we sometimes fail to realize that the fight to protect domestic livestock from wild animals is still going on. The United States Biological Survey cooperating with the States maintains a corps of expert hunters and trappers to aid in holding in check these enemies of the livestock producer.

Hunters are sent when requested to localities where losses become heavy to help the stockman and farmer, with advice, demonstration, or actual operations, to keep the wild animals in control. A lone wolf is known to have destroyed as much as $25,000 worth of livestock before its depredations were ended. In Arizona, another hunter found the bodies of nine head of cattle killed by a mountain lion. On a single ranch in Texas one bobcat killed more than $300 worth of Angora goats, and another killed 53 rams, 1 ewe, and 1 goat. In Oregon four coyotes in two nights killed 15 purebred rams, and in Colorado, 67 ewes worth more than $1,000 became separated from the rest of the herd and two days later all were found killed by coyotes.

These are just a few of the thousands of single instances of the past sixteen years demonstrating the necessity for control work.

The Survey men and their cooperators call it control work, because that is just what they are trying to do---keep the beasts of prey under reasonable control. This means keeping the damage to farmers and stockmen down to a minimum. They are not trying to exterminate any species of our wild animals.

The fact is, the naturalists who know the habits of the coyote doubt whether we could ever actually exterminate that wily animal, even if we wanted to.

But as long as the coyote continues to be a menace to domestic sheep, cattle, and goats, to pigs and poultry, as well as to such wild animals as the deer, the antelope, and the mountain sheep, and to the ground-nesting birds, it must be evident that the numbers of the coyote will have to be kept down and its spread checked.

However, in order to protect livestock and make farming and grazing possible we not only have to protect the stock from direct attack by mountain lions and wolves and coyotes and other predators, but we also have to protect the food supply of the stock from attacks by rodents----smaller pests, such as prairie dogs, and ground squirrels, and pocket gophers, and rabbits, and field mice, and rats. Of all the economic wasters, the rat is the most generally known and the most destruct

In some cases it has been learned that some of the wild animals carry diseases to domestic livestock and to human beings. From time to time, great plagues sweep through the wilds; and it seems highly probable that the overcrowding of animals in their natural range may aggravate such troubles. Rats and ground squirrels have helped to spread the dread bubonic plague, which is believed to be the same as the famous "Black Death," which carried away thousands of people in European cities during the Middle Ages. Ground squirrels also carry spotted fever. Wild rabbits can transmit deadly tularemia. And coyotes have been known to carry hydrophobia.

On the other hand, many of our wild animals are highly valuable for furs and food. One of the problems faced by the United States Biological Survey in its campaign against predatory animals is how to get rid of the pests without killing the fur bearers and other desirable kinds of wild life.

The methods employed vary with the locality and with the different pests. Some of the larger and less numerous pests are hunted down by expert marksmen. Some are trapped. Others are poisoned. The method adopted in any particular case are designed to get the most effective control with the least danger to other wild animals and domestic stock and with the least suffering to the predators themselves.

For killing coyotes, for instance, poison,used as directed by the Biological Survey, has been found more humane than steel traps, and its use has been safeguarded so as to protect as much as possible the smaller fur bearers and other forms of wild life.

To know without question of doubt the exact economics status of each predator, the naturalists go back to the food habits of the animals themselves. This summer a branch laboratory will be established in the West to carry on investigations of the stomach contents of coyotes and other predatory animals to supplement the knowledge that has been accumulated over a number of years by field examinations of stomachs of animals killed.

A knowledge of the peculiarities of diet and other feeding habits of the different wild animals also aids in selecting and so placing them as to get the best results with the least danger to beneficial wild animals.

Don't get the idea, however, that such control operations are being carried on everywhere in the wilds. They are carried on only where control is needed to protect properly other forms of life---both interesting species of the wild and domestic livestock.

In many parts of our national forests, on Indian reservations, and on other public lands, the United States Biological Survey is doing absolutely no work for the control of either the predatory animals or the rodents, and the officials tell me they are planning none. In such remote places and in the national parks they are leaving nature to take care of her own, and in these areas the struggle of life in the wild goes on without interference, and the primitive conditions of the country are not disturbed.

ANNOUNCEMENT: Every two weeks this Station_____joins with the United States Department of Agriculture in presenting you some of the activities of Uncle Sam's Naturalists. We will have another of these talks two weeks from to-day.

UNITED STATES DEPARTMENT OF AGRICULTURE
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WITH UNCLE SAM'S NATURALISTS

RELEASE Friday, June 19, 1931.

NOT FOR PUBLICATION

ANNOUNCEMENT: Our Wilds Man has been for another visit with Uncle Sam's Naturalists. Specialists of the United States Biological Survey have helped him hunt down a few facts about bobcats. Now he is going to bring home to us what he has found out about these dangerous subjects ---- Listen! ----------

--oOo--

I used to know a man who bragged he could "whip his weight in wild cats."

That was the height of boasting, we thought.

Those who claim to have first hand information say a bobcat is just concentrated dynamite---T.N.T. on four legs---and some experienced hunters think mayb it has more than four when you get one at close quarters.

Wild stories about fierce encounters with ferocious bobcats have been circulating since early pioneer days.

But I'm not here to tell you a string of those stories to-day, but just to call your attention to a few practical hints on bobcat trapping from Mr. Stanley P. Young, in charge of the predatory animal and rodent control division, of the United States Biological Survey.

According to Mr. Young, the advance of settlement and the occupation of the bobcat's former ranges for stock raising have not so much crowded back the bobcat, as they have given it a new and satisfying provender. The young of the flocks and herds of our stockmen and the poultry of our farmers are now part of its meat. On the wild ranges, the bobcat feeds to a large extent upon rabbits and other injurious rodents. But it also preys upon such valuable forms of wild life as antelope, deer, and other game animals, especially the fawns, and on wild turkeys, and quail, and other ground-nesting birds.

Evidently, however, the bobcat finds the young of domestic livestock very satisfactory substitutes for its ordinary fare in the wild. When it can get its living easier among the flocks and herds than in the wild, it can do a lot of damage in a very short time; especially to sheep during the lambing season; and to pigs, and goats, and calves, and poultry.

In fact, in some localities bobcats have made hog raising on an extensive scale impracticable. And when lambing is conducted on the open range, a practice common in the West, the wild cat often causes heavy losses.

Under such conditions, the stockman or farmer has no choice but to take steps to check the bobcats. Mr. Young says the best way to do that is by trapping. Bobcats maybe caught in traps of the common double-spring steel type, sizes 2 and 3, such as have been used by trappers for many generations.

Some folks think such traps are inhumane, but Mr. Young declares that no better or more practical device has as yet been invented to take their place.

And the farmer who has had a bobcat sneak into his flock of sheep needs an effective device.

Ordinarily, the bobcat comes under cover of darkness. It works quietly and swiftly in a flock of sheep, and often causes little commotion. The lamb is most often killed by a characteristic bite on the back of the neck or head. Then i is pulled down to be eaten. If the lust for killing is not satisfied, the bobcat may kill other lambs the same way. It may keep working quietly until it has killed many. In fact, a single bobcat has been known to kill 38 lambs in one night.

The bobcat is related to the mountain lion, though it is a much smaller anim and has somewhat different habits. Its larger cousin, the Canada lynx, is found in the northern, more forested parts of the United States.

The bobcat has keen sight and a good sense of smell, though not as keen a sense of smell as a wolf or a coyote. Most of its hunting for food is done at night.

As you may know, the common house cat is the only cat that has ever been domesticated, still we can't trust the peaceful Tabby out of the house after dark. Even after thousands of years of association with human beings, the house cat is only a part-time pet. It reverts to the wild on slight provocation and becomes a prowling killer, especially after dark.

These other cats, however, are savage destroyers, the wildest of the wild working at it full time.

Those who know these predators have no hope that they will ever reform. Whatever it is that makes a wild cat wild seems to run in the family.

And in trapping bobcats, the farmer or stockman needs to take advantage of some of their well-known habits. For instance, a bobcat will generally step over a root or a rock or a clump of grass in its path. So Mr. Young suggests that either single or double blind sets may be used. In this case, traps should be placed in holes dug directly in the trail of the bobcat and just beyond such an obstruction. When the bobcat steps over, it steps in the trap. A better set, according to Mr. Young, is the scent set. When one of these is made, a scent attractive to bobcats is used to lure the animals to the traps. These traps should not be placed in the runway proper, however, as with blind sets, but off to one side parallel with the trail.

Catnip has been used in the scent trap set with a fair degree of success. Some Biological Survey hunters use catnip as a lure by dropping into a small glass jar or bottle, saturated gauze or cotton batting. They then bury the bottle up to the mouth, but the mouth is left level with the ground. It is protected by a perforated top, and if the top is bright it is camouflaged by moistening it and brushing it over with dust or sand while it is wet.

As Mr. Young says, success in trapping, whether for bobcats or for other predators, depends a lot on the trapper's attention to seemingly minor details. For that reason, I'd suggest you get hold of Leaflet No. 78-L, called "Hints on Bobcat Trapping." That will give you complete details.

For instance, while digging holes for the trap sets, the trapper should leave no tell-tale signs or scents. One good way to avoid this is to stand or kneel on a "setting cloth" made of canvas, sheepskin, or calf hide, which has been buried in an old manure pile, so that there will be no human scent on it to arouse the bobcat's suspicions. The dirt taken from the place where the trap is bedded may be piled on the setting cloth, and surplus dirt not needed for covering the trap should be scattered on the ground at some distance from the set. It is also well to wear gloves while setting the trap.

But there are a number of details to be considered in trapping bobcats. Better write for that Leaflet No. 78-L, so you may be sure of doing everything necessary to get the best results. You can get a copy of this Leaflet by writing to the United States Department of Agriculture. It is free as long as the supply lasts. It will be off the press in two weeks, so your requests may be sent now.

ANNOUNCEMENT: Write either to Station --------- or direct to the United States Department of Agriculture at Washington, D. C., and ask for Leaflet No. 78-L, on "Hints on Bobcat Trapping." Copies are free as long as the supply lasts.

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WITH UNCLE SAM'S NATURALISTS. RELEASE Friday, July 3, 1931

NOT FOR PUBLICATION

Speaking Time: 10 Minutes

ANNOUNCEMENT: And now for a little bit of wild life! Station _____ joins with the United States Department of Agriculture in presenting some of the results of hunts into the wild by Uncle Sam's Naturalists. Today we are to hear some of the secrets of insects ---- You know, insect pests are not only wild but often make us wild ---- Well, Mr. Wildsman? ----

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It is very important to know how insects get around. We need to know, so we can get around the insects. That is especially true in the case of some of our big crop pests. We need to know how they travel, in order to know how to stop their spread into new territory.

Some, of course, crawl from one field to another. Others fly. There are strong flyers and weak flyers. That sounds simple. You might think it would be easy to pick the long distance flyers by their design and build. You might figure that those with strong muscles and big wing spread would go further on a non-stop flight.

But you must remember that some of the flyers hitch-hike on the wind.

The Bureau of Entomology specialists have been working trying to get the facts about insect spread.

They tried building screens at some height from the ground to catch the insects on the wing. For all practical purposes, that only gave information on conditions within the fields and the first few feet of air above them.

Of course, you all know that as we go higher in the air, the wind often changes. The wind a few thousand feet up may be blowing in an opposite direction from that on the ground. Which wind were those insects riding?

Well, the Bureau of Entomology went up to find out. They started chasing insects by airplane. That is, they equipped an airplane with a special trap to catch insects. It was a screen with sticky stuff on it so arranged that it could be exposed or shielded at will. In that way, the entomologist could fly to a certain level, and expose the trap for a certain length of time at that level, so as to catch the insects at that level and no other.

You know, we ordinarily think of insects staying pretty close to earth. And, of course, the big part of them do. But it was surprising even to those insect experts to find how many insects get high into the air, and how high they do get.

With those traps in the airplane, they made collections all the way from 50 feet above ground up to 14,000. And they found insects at all levels. Naturally, the densest insect population is in the first 1,000 feet. But at 2,000 feet they found about half as many as at 1,000. And at 3,000 feet, they found half as many as at 2,000 feet. From about 3,000 feet up to 5,000 there was not much difference. And from 6,000 on up the number got considerably lighter. But there was a remarkable number found even at that height.

Some of these scientists figured out how many insects there would be in a column of air 1 mile square and 14,000 feet high, not counting those any lower than 50 feet above ground. And understand, the collections, on which the calculations were based, were made at all seasons of the year. The flights were at Tallulah, Louisiana, and it was calculated that there was an average of 25,000,000 insects over one square mile. Twenty-five million insects up where we ordinarily think of there being few to none! In January, the number was about 12,000,000 and in May about 36,000,000.

Of course, that brings up the question, "What insects?" And the entomologists found some striking things when they sorted the catches out according to kind. They found, for instance, that the bigger, stronger flying insects are collected closer to the earth and that the smaller, weaker insects are the ones chiefly found at the higher altitudes. In fact, they found many absolutely wingless insects way up in the air.

For instance, as high as 10,000 feet up, they found balloon spiders, which have no powers of flight but are carried by air currents entirely. Mites were also found way up there.

So you see, insects have two methods of air travel just as we have. We have free balloons which drift with the wind, and then we have aeroplanes which move under their own power, either with or against the wind.

Among insects, there are the heavy, strong flyers, and there are those weak, light bodied insects which are picked up by rising air currents and carried helplessly in the wind. Then there are the betwixt-and-between insects which can do some flying on their own account, and are carried partly by the wind and partly by their own efforts.

The entomologists found, for instance, that generally speaking, such strong flyers as the cotton leaf worm moth and similar species fly at levels below 3,000 feet. Occasionally, however, they did collect individual cotton leaf worm moths as high as 5,000 feet. No boll weevils were found any higher than 1,000 feet. Tarnished plant bugs were found up to 3,000 feet, and cotton flea hoppers up to 5,000 feet.

On the other hand, such insects as leaf hoppers were found up to 7,000 feet above ground. From there on up to 14,000 feet the airplane traps

captured tiny parasitic flies, and wasps, and plant lice, and similar light, small-bodied insects. In fact, the insect specialists think that probably such light insect wind drift will be found considerably higher than the 14,000 level at which they stopped their collections.

The pink boll worm moth, which has been supposed to be a comparatively weak flier with a decided tendency to stay down among the plants, was found as high as 3,000 feet in the air.

According to Mr. B. R. Coad, the principal entomologist who had charge of this investigation, there is no question that as this work is continued and extended it will throw more new light on how many insects travel. Air currents at the higher altitudes often become very swift compared to the winds at the ground. Once an insect gets up into such fast currents of air, it may be carried forward on them for hundreds of miles within a comparatively short time. Then a descending current of air may return it to earth where it may start a new center of infestation.

These findings will probably have an important bearing on many of our plans to fight insect pests.

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ANNOUNCEMENT: That is catching your insect facts on the wing! In telling you about this work of Uncle Sam's Naturalists Station _____ was cooperating with the United States Department of Agriculture. This time week after next we'll overhear something else from Nature's laboratories.

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WITH UNCLE SAM'S NATURALISTS. RELEASE Friday, July 17, 1931.

NOT FOR PUBLICATION

Speaking Time: 10 Minutes

ANNOUNCEMENT: And now for our visit with Uncle Sam's Naturalists of the United States Department of Agriculture. Canary birds, cottontail rabbits, prairie dogs, and muddy streams are among the subjects our Wildsman will briefly touch on today----- Well, Mr. Wildsman? --------

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Canaries have been kept for pets for four or five hundred years. In fact, nobody seems to know for certain just where they did come from, they are supposed to have originated from the "wild canary" of the Canary Islands or one of the birds that is close kin to the wild canary.

But whatever wild bird became the first captive canary, the naturalists seem to be fairly well agreed that the original canary was a very different looking brid from its modern pure-bred descendant which trills apparently so contentedly in its gilded cage.

Anyway, the "wild canary" and the serin finch, which have been suggested as the probable ancestors of our household canaries are both more or less gray, tinged with olive green with dark streaks on the feathers. Our common canaries have been considerably changed in color.

I mention this change, because I noticed a feather in our canary cage, and I suspect our canary bird is about to change his coat. The latter part of July is a little early. Canaries usually start to molt during August and on the average the molt reaches the height in September. The entire gradual change of feathers takes about two months.

During the molt is the time to color feed canaries so as to deepen or intensify their color. Turmeric, marigold, flowers, saffron, cochineal, annatto, mustard seed, and other foods rich in natural color are often used to produce interesting color changes.

For a long time, methods of preparing and feeding color foods to canaries were kept secret, but now they are outlined in many manuals on canary feeding, including Farmers' Bulletin No. 1327 on "Canaries, Their Care and Management." Our present-day canaries are the result of careful selection and breeding, but their color can be modified to a certain extent

by special feeding.

Speaking of feeding, however, reminds me of our old friend the cottontail rabbit, and that Farmers Bulletin No. 702 called "Cottontail Rabbits in Relation to Trees and Farm Crops." In other words, I call the cottontails my friends because I have had a good deal of sport hunting them in my time, but I realize that some of you men can't exactly regard cottontails as your friends. They do considerable damage at times to your crops and trees. For that reason you may be interested in ways to get rid of rabbits, which you may find in that bulletin.

Cottontail rabbits, you know, eat all sorts of herbage; leaves and stems and flowers and seeds of plants and grasses, and the leaves, buds, bark and fruits of woody plants and trees. They usually prefer young shoots and tender garden vegetables and fallen ripe fruits; but they can be very particular at times.

Sometimes, for instance, they will eat one variety of alfalfa down to the ground and do little or no damage to other varieties nearby. They have been known to show a similar preference between varieties of soybeans. When they can't get what they prefer, cottontails will take what they can get. During summer droughts, they often attack the bark of growing trees and shrubs.

I guess you all remember the story of the little Dutch boy who discovered the leak in the dike holding back the sea. He stuck his arm in the hole and plugged the leak until help could come. He was a hero. He saved his land from being flooded.

But Mr. A. M. Day, of the United States Biological Survey, has been telling me a story from nature which is somewhat the reverse of that. It is about a little villain instead of a little hero.

This little villain was a lone pocket gopher. He burrowed through an irrigation canal that carried 18,000 inches of water for the irrigation of 30,000 acres.

As I say, the rodent burrowed through that canal. It cost $5,000 to repair the break that resulted. And before the ditch could be put in service again drought got 25 per cent of the crops on that land.

And that is just one instance of that same kind of damage often done by such burrowing rodents as pocket gophers, and prairie dogs, and ground squirrels. And that was just one pocket gopher.

Western range and farming lands are infested by literally millions of prairie dogs, and ground squirrels, and pocket gophers. And their excavations, Mr. Day tells me, are definite means of starting erosion which does an appalling amount of damage to our lands every year.

Here is what happens in the case of prairie dogs. Prairie dogs build those big mounds in inverted-funnel shape. They do that to prevent rain water draining into their underground burrows. As a means of protection against their natural enemies as well as for food, they keep all the grass cropped close within 15 or more feet from their burrows.

And they are not satisfied merely to crop the grass close, they dig out the roots. Thousands of acres of valuable western range land have been bared in that way, and many cases of erosion have been traced to that damage by prairie dogs.

But Mr. Day seems to think the pocket gopher is a much worse offender in that respect than is the prairie dog. Pocket gophers burrow away with apparently untiring efforts. In summer they throw the dirt from their burrows up to the surface, piling it up in mounds. When the snow comes in the fall, and before it has melted in spring, the pocket gophers push the dirt out of their burrows in the form of long chainlike ridges. These ridges from minature dikes or earthworks, channels for water from the melting snow. That helps the water begin cutting away the soil.

Later, come the sheep and cattle into the ranges. The tramping stock break through into the shallow passageways of the pocket gophers. More and deeper channels are made to carry off the melting snow and rains.

Mr. Day tells me that in many areas after the forage has been destroyed and much of the surface soil taken off in this tramping of livestock and washing by rains, weeds and often poisonous plants gain a foothold. Of course, that creates a serious range condition.

The rancher who sits as coroner in the death of his own cattle from eating poison plants may never even suspect the little pocket gopher had much to do with starting the conditions which made things favorable for those poison plants.

These are just a few of the reasons the United States Biological Survey is organizing rodent control units to help keep the numbers of these injurious rodents within bounds. By killing off rodents these units help prevent further loss of soil through the erosion started by rodents.

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ANNOUNCEMENT: The bulletins mentioned can be had free of charge as long as the supply lasts. Write for them to this Station _____ or to the United States Department of Agriculture, at Washington, D. C. The bulletin on "Canaries, Their Care and Management" is Farmers' Bulletin No. 1327 and the one on "Cottontail Rabbits in Relation to Trees and Farm Crops" is Farmers Bulletin No. 702.

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WITH UNCLE SAM'S NATURALISTS. Friday, July 31, 1931.

NOT FOR PUBLICATION

Speaking Time: 10 Minutes.

ANNOUNCEMENT: And now for another visit with Uncle Sam's Naturalists of the United States Department of Agriculture. As usual, your Wildsman calls our attention to some of the facts about wild life as he picks them up from Department specialists --- Well, Mr. Wildsman, what is it this time?

We've all been hearing the "March of the Grasshoppers" recently. A devastating plague sweeping through the Northwest has given us a terrible demonstration of what a big insect outbreak means when conditions are right for it.

But I'm not going to talk about that all-devouring host of grasshoppers. I just mention it in passing, by way of illustration of the importance of some other things.

Such serious scourges caused by tremendous multiplication of this or that pest might happen oftener but for the forces of nature which tend to keep such things in control. Of course, the weather is generally the big factor in the case of grasshoppers, but there are a number of other forces, not the least of which is our old friend, the much-despised skunk.

A lot of people have always held skunks in bad odor, but skunks do yeoman service in destroying grasshoppers. Specialists of the Bureau of Biological Survey, who have inside information on the subject, tell me that in July, August, and September, when grasshoppers are most abundant, they form the chief food of skunks. In fact, during some of the previous invasions of our plains country by grasshoppers the skunk was credited with being the principal mammal destroying those insects.

But grasshoppers are not the only damaging crop insect on the skunk's bill-of-fare. The skunk is also the best-known mammal enemy of army worm, the common army worm, the wheat-head army worm, and the fall army worm, which are so destructive to small grains, and corn, and grasses.

Skunks are fond, too, of the insects known as tobacco worms which do so much damage to tobacco and tomato plants. In fact, they eat a great number of insects and mostly the kinds that are highly damaging to plant life, such as cutworms, cicadas, crickets, and beetles injurious to sweet potatoes in the South.

They also seem to consider the Colorado potato beetle a delicate morsel and spend many a busy evening in potato patches catching and eating the grubs and mature beetles.

However, insects are not the sole food of skunks, by any manner of means. These beautiful little black and white "polecats", as we used to call them, have been accused of killing quail and other game birds and of taking chickens and eggs. And they do sometimes, but more often they get blamed for some other animal's depredations. As a matter of fact, I've known quails to nest and hatch out a brood within a few rods of a skunk den. The truth seems to be that at the season when our native game birds are nesting, skunks have plenty of insect food, and by the time that food fails, the birds are strong of wing and seldom fall a prey to a polecat.

As for the chickens, the skunk gets credit for a lot of killings by weasels and minks, which are much better climbers and far more bloodthirsty. Likely as not, the skunk detected around the hen house was there after the rats and mice. Polecats are really remarkably fine mousers. Of course, the individual that hunts and kills chickens should be destroyed.

Most such suspicion, the specialists tell me comes from the fact that skunks work largely under cover of darkness and the person who sweepingly blames the skunk usually doesn't go to the trouble of investigating thoroughly. Evidence taken from the stomachs of a large number of skunks supports the idea that skunks are on the whole highly beneficial in their food habits.

And of course we all know that skunk skins are highly prized for fur. Nowadays we just have three fairly abundant fur animals left in the United States; the muskrat, the mink, and the skunk. The biologists say that there seems to be little danger of extinction of the muskrat, but that the mink is already in danger, and that the demand for skunk fur is causing more and more trapping of skunks.

However, as far as the fur question goes it is believed that skunks can be domesticated and successfully raised in captivity in many parts of the United States. There is a bulletin, Farmers' Bulletin No. 587 on "The Economic Value of North American Skunks" for anyone interested in the subject. It tells how to trap and raise them and how to remove those famous scent sacs which put skunks in such bad odor with many people.

And while we are mentioning misunderstood wild creatures, let me say a good word for the European Starlings, now found as breeding birds in many of the States east of the Mississippi River. In the last twenty years, they have spread fast, and there seems every reason to expect that they will continue to spread westward to the Rocky Mountains, and if the Mountains don't stop them, right on to the Pacific Coast.

A lot of farmers and bird lovers have looked with suspicion on the ever-increasing flocks of these birds and have accused them of many crimes. And specialists of the Biological Survey admit that Starlings do damage cherries, and other small fruits, and garden truck, and even late fruit and corn. And probably their filth-producing roosting habits in cities are more largely responsible for the bad name they have acquired.

Weighing starling's good habits against their bad ones, however, our scientists credit starlings with doing much more good than harm. They are insect eating birds, and observations of them in the field has established the fact that the time spent by starlings in destroying crops or in molesting other birds is short compared to the endless hours they spend searching for insects or feeding on wild fruit.

Starlings help destroy such pests as the clover-leaf weevil, the Japanese beetle, May beetles, cutworms, and yes, grasshoppers too. As insect destroyers starlings are more energetic than some of our protected native birds. Farmers'Bulletin No. 1571 on "The European Starling in the United States" weighs their good and bad qualities and also tells how to control them, when that is necessary.

Now let's turn to a different subject and observe another phase of wild life and life in the wild.

Mr. Earl W. Tinker, regional forester of the United States Forest Service, has been telling me some of the unusual problems in fire protection in the Superior National Forest in Minnesota.

As you know, one of the problems of fighting fire anywhere is getting the fire fighters to the fire and getting them there promptly.

In most of our forests, there are a network of roads and trails designed to permit fast travel. But in the Superior National Forest we have some 1,000 square miles set aside as a primitive area, where there are no roads, and practically no trails. It is a wild country, with little human habitation, but plenty of game such as moose, and deer, and wolves, and other fur animals. And what's more it is interlaced with a labyrinth of waterways, lakes, and great areas of spruce and muskeg swamp.

Mr. Tinker says it is practically impassable to foot travel in summer. The cruising of timber and other activities of the Forest Service are done in winter when the lakes and swamps and streams are frozen and dog teams can be used for transportation. The usual way to get around in summer is by canoe and portage — and that is slow hard work --- too slow for men going to a fire. One and one-half miles an hour is considered high speed in that region.

To meet that situation, the Forest Service plans to improve the portages and on the chief travel routes to install light tracks over which fire equipment can be moved faster. They also plan to improve the water routes by installing dams to do away with slow portage work. Hydroplanes have proved a great success in rapid transporation of small fire-fighting crews. By the use of planes, small crews have been carried to the scene of a forest fire in the Superior National Forest in 30 minutes where previously it took a day and a half.

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ANNOUNCEMENT: Those bulletins mentioned are free of charge, as long as the supply lasts. You can get them either from this Station_____or direct from the United States Department of Agriculture. Ask for Farmers' Bulletin No. 587 -- 5-8-7--on "The Economic Value of North American Skunks." and Farmers' Bulletin No. 1571 — 1-5-7-1 -- on "The European Starling in the United States."

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WITH UNCLE SAM'S NATURALISTS RELEASE Friday August 14, 1931

ANNOUNCEMENT: Again we are going to hear from Uncle Sam's Naturalists of the United States Department of Agriculture. Every two weeks this Station cooperates with the Department in presenting these talks in which our Wildman tries to give us inside information on life in the outdoors.---- Well, Mr. Wildman?------

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"The time has come, ' the Walrus said,
'To talk of many things:
Of shoes--and ships --and sealing wax--
Of cabbages --and kings--"-----

With your permission, I'll amend those words of the Walrus by leaving out "cabbages". But we will get around to those other subjects.

Let's start with ships, particularly sail ships. Now that "Old Ironsides" otherwise known as U.S. "Constitution" has been re-fitted, we can see her as she was in the days of her glory.

I'll admit, I get a thrill at the mere idea of that sturdy old warship plowing through the waves with all sails set. And I also love to think of those famous clipper ships that came along a little later and carried the merchandise on the seven seas and made our flag known in every port.

Those old sail ships were outfitted with sails, and ropes, and cables, and halyards, and shrouds all made of hemp fiber. And the seams in the hull were caulked with hemp. To meet the demand for hemp for ships, new land was sown to hemp and new hemp mills were set up.

Of course, we had had hemp before that. In fact, the Pilgrim Fathers at Plymouth and the Cavaliers at Jamestown planted hemp and flax among their earliest crops. The clothing of the men was hempen homespun, and it did not quickly wear out. The very word "canvas" comes from the Arabic name for hemp. But the spread of our sail shipping caused a big boost to hemp growing, and even the prairie schooners which crossed the plains before 1860 were covered with canvas made from hemp.

However, hemp for marine cordage has been superseded by abacá or Manila hemp, because the abacá ropes, and cables, and hawsers are lighter and will float in water and that hard fiber is resistant to damage from salt water without being tarred, Hemp rope has ceased to mean anything for in America ropes are no longer made of hemp.

Then, too, cotton has replaced hemp for many purposes because it can be spun more easily and with less waste and makes smoother and more uniform yarns. Sails on American ships, once made from linen and hemp are now made from cotton. One ship now afloat, though, has cordage equipment that harks back to the days when hemp was the queen of fibers for ship uses. I refer to "Old Ironsides" otherwise the USS Frigate Constitution, famous warship relic of the war of 1812. As lately reconditioned, "Old Ironsides" has been supplied with ropes of hemp fiber grown in Wisconsin, Illinois and Kentucky.

But to get back to our story of the decline of hemp, jute has replaced hemp for many temporary uses such as covering for cotton bales and packages of merchandize in transit and sacks for coffee and sugar and grain, But the weak and short-lived jute does not give as satisfactory service as the stronger and more durable hemp for twines for tying heavy packages, or for uses in which it must be exposed to the weather all summer, or for carpet warp that ought to last many years or for furniture webbing that should last a lifetime.

Hemp imported from Italy and hemp produced in Wisconsin, and Illinois and Kentucky is still used for a few purposes where strong long-lasting twines are demanded, but since the World War our importation of hemp has fallen off to about a fourth of what it was in the years just before the War, and our domestic production is now just about half what it was then.

That is, despite its valuable qualities, hemp is losing ground. Of course, it is still used for marine oakum for caulking the seams of ships and other water craft.

You know the tar and the pitch used on oakum for caulking boats used to also be quite an item. In fact, since Noah pitched the ark within and without with pitch, the tar and pitch made from the crude resin from pine trees has had an important place in the building and repairing of water craft from John boats to ocean sailers. That pine tree pitch and tar used to be called "naval stores"

And, of course, as our sailing fleets grow the demand for "naval stores" also grew. But along about the time our famous clipper ships began to disappear, new uses began to be found for the crude resin from our pine trees. Today we still speak of "naval stores" and the "naval stores industry" but what we are talking about is turpentine and rosin which go into a thousand uses unconnected with boats, and supply an industry in which about $50,000,000 is now invested, in this country.

Yes, sir, "shoes--and ships--and sealing wax" all get their share of the turpentine and rosin obtained from the longleaf and slash pine trees. Turpentine is used as a thinner for waxes in shoe and leather polishes and as an ingredient in the manufacture of patent leathers, Rosin is also

used in leather dressings and shoe polishes. And these naval stores are used in sealing waxes.

When you figure that there is a billion dollars invested in our paint industry which has a working force of 100,000 men, you begin to realize how important turpentine is in the paint industry alone.

But there are many important uses of turpentine besides as a thinner for paints and polishes, not only for shoes, but furniture, and floors, and stoves.

Rosin is used in the manufacture of soap and for surfacing paper for printing and writing. It is used for the manufacture of rosin oils, varnishes, and paint dryers, in waterproof compounds, in roofing materials, in the manufacture of linoleum and oil cloth, in printing inks and many other important articles including ointments, plasters, and disinfecting compounds.

Today about two-thirds of the world's so-called "naval stores" are produced from the gum of the pine trees in the southern United States.

In fact, so great has grown the demand for the products from those pines, that the Forest Service of the Department of Agriculture has found that provision must be made to insure a continuous crop of the turpentine trees, by protecting the forests from fire and from the razor-back hogs that eat large quantititos of the longleaf pine seed and destroys vast numbers of the baby trees by rooting them up to feast on the thick, juicy bark of their taproots.

In the old days, the turpentine pines were seriously damaged by haphazard methods of the operators who often destroyed a stand of timber by working trees too small to stand turpentining, or by working them too hard.

For fifteen years the Forest Service has been trying to find out and demonstrate methods of turpentining that yield the best returns. But the picturesque story of the turpentine tree and the main finding of the foresters which will enable us to keep our great "naval stores" industry on a permanent basis are contained in a publication called "Pine Tree Treasures". It is Miscellaneous Publication No. 106.

Now we are back in the woods and fields, after a little dip in the ocean and a stop in the home. I might moralize about how times change, and with them supply and demand, but I will leave that to you, while I just dream about these old ships running before the wind under full canvas.

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ANNOUNCEMENT: Two weeks from today Station-- - will present another talk with Uncle Sam's Naturalists. In the meantime, if any of you want "Pine Tree Treasures" you can get it by writing either to this Station or direct to the United States Department of Agriculture, at Washington, D.C. "Pine Tree Treasures" is Miscellaneous Publication No. 106. It is free as long as the supply lasts.

UNITED STATES DEPARTMENT OF AGRICULTURE

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WITH UNCLE SAM'S NATURALISTS:

RELEASE Friday, August 28, 1931

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U. S. Department of Agriculture

NOT FOR PUBLICATION

Speaking Time: 10 Minutes.

ANNOUNCEMENT: Now let's "go forth under the open sky and list to Nature's teachings" as interpreted to our Wildsman by Uncle Sam's Naturalists of the United States Department of Agriculture. They have been giving him a bird's-eye view — or rather a duck's-eye view, of the drought. And it is anything but a pretty view ---- Isn't that right, Mr. Wildsman? -----

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Yes, I've been going over some of the reports which have been made to the United States Biological Survey on the effects of the drought on waterfowl.

In Montana one of the Biological Survey scouts found that 75 per cent of the ponds, sloughs, and shallow lakes, which are the natural breeding grounds, were dry.

And remember a duck out of water is not only a duck out of water, but a duck out of food and water. When the waters get low in many cases the plants ducks feed on are killed off. That old expression "like a duck out of water" has its truly tragic significance.

Game wardens in South Dakota have reported they can't find any mallards in areas where plenty of mallards have nested heretofore. South Dakota this year will probably produce only about half as many mallards as usual.

Similar word comes from the great duck marshes of eastern Oregon and Washington. On many duck lakes in the sandhills of Nebraska the hatch of ducks this year was reported as a total loss.

Even on the great Bear River Marshes at the north end of Great Salt Lake, Utah, the year's duck crop is only half of last year, and last year was a bad year.

During the breeding season last spring water was almost totally absent in practically all our important wildfowl nurseries. In fact, Mr. F. C. Lincoln, of the Bureau of Biological Survey, has summed up the situation as the most serious in the entire history of ducks on this continent.

Of course, you all know, that while we have some important nesting grounds for waterfowl in this country, most of the ducks we depend on for our shooting really come from Canada.

I'll admit I've heard this so often, that I've come to think of Canada as one vast nesting ground of ducks, geese, and swans, extending from ocean to ocean and from our northern border straight on up to the North Pole or thereabouts.

However, I think Mr. Lincoln and the Northwest Mounted Police have helped set me a little straighter on my geography, as far as ducks go. Actually the great central prairie strip that extends from the boundary of North Dakota and eastern Montana north to Great Bear Lake contains the most important breeding ground for ducks in North America. And that certainly is a sizable strip.

But that also is the strip which includes Canada's big farming country. In the last few years, many of the marshes where the ducks used to nest have been drained. Today thousands of acres of wheat are grown on land that formerly supported ducks.

Yet even with all that big-scale farming, that is still the chief home of our ducks.

For three years hand-running now the drought has sucked water out of the remaining ponds, and lakes, and marshes.

An investigator of the United States Biological Survey in cooperation with Canadian officials has gone over that drought-stricken region from the foothills of the Rocky Mountains in Alberta east to Manitoba and north from our border to the great delta region of the Peace and Athabaska Rivers. He reports that in traveling those several thousand miles they found only parched grain fields, dried-up sloughs and marshes, and only a few dozen small broods of young ducks in an area that in normal years produces myriads of mallards, pintails, redheads, canvasbacks, bluebills, and teals.

Well, you say, maybe the ducks have just moved further north to some other place where conditions are better suited for nesting and rearing of young.

Any such notion is not according to what we know about geography and ducks, the bird specialists say. There is no such place to which these prairie-nesting ducks could retreat even if they were so inclined. In spite of that, the Canadian government, through the Northwest Mounted Police, has made far-reaching inquiries about ducks. That force reputed always to get its man, reported no signs of other and more remote breeding grounds of ducks.

In fact, there was evidence that what ducks still lived were on the regular breeding grounds. Flocks of full-grown ducks were found on some of the bigger and deeper lakes, at the time they should have been paired and scattered through the marshes raising their young. In other words, it seemed that they were not raising young.

What that will mean to sportsmen in this country this fall and winter is rather plain. The shortage of breeding birds in Canada and the loss of so many young will have a very serious effect upon shooting conditions in both this country and Canada. One of the biggest problems ever faced by our game officials will be to preserve the breeding stock through the next few years, and nurse our duck supply back to normal abundance.

However, they tell me there are already signs that sportsmen will show their sportsmanship instead of the feathered trophies of their marksmanship this fall. Those who had gone over the discouraging reports and witnessed conditions in the marshes seem to agree that it is only by cutting down on the kill of ducks this fall that we can avert the grave possibilities of a permanent disaster to our waterfowl. It is a question of limiting the number of waterfowl to be killed this season and the next few seasons, rather than having to give up duck-hunting for all time.

Some of you may recall, a few months back I was what some of you might call "viewing with alarm" the reports of the results of last year's drought. In order to meet the situation then, the Biological Survey announced that the open season would be cut down this fall by two weeks. In other words, before the full effects of another year's drought were known, it was already apparent that rather drastic action would have to be taken to save our ducks and duck-hunting.

Now on top of that rather discouraging situation, several more months of drought conditions have dried up all hopes for relief and made this a real year of duck disaster.

Maybe what ducks are left will find better conditions next year or the next few years. When I was talking to Mr. Lincoln, the officials of the Biological Survey had not decided just what further restrictions on duck hunting would be necessary. But at that time, some sportsmen already had advised the Bureau that they intended to forego all duck shooting during this coming season, and the indications were that some of the largest duck clubs would not open. That's real sportsmanship -- and good common sense.

Better let what few ducks you might otherwise get go back to their breeding grounds in Canada or in this country and raise families. The future of duck hunting depends on those ducks that have survived the drought. If we are to have future years of duck hunting, we might as well remember the old adage -- "You can't have your cake and eat it."

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ANNOUNCEMENT: This survey of the duck situation, is presented by Station ____ in cooperation with the United States Department of Agriculture. It is one of our regular twice a month visits with Uncle Sam's Naturalists. We will have another two weeks from today.

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WITH UNCLE SAM'S NATURALISTS. Friday, Sept. 11, 1931.

NOT FOR PUBLICATION

Speaking Time: 10 Minutes

Rat Control.

ANNOUNCEMENT: Every other Friday our Wilds Man gives us a few nature facts which he gathers from Uncle Sam's naturalists. Today he promises to tell us about his visit with Mr. James Silver, of the United States Biological Survey ------ What did they talk about ------ Aw, rats! ---- I'll let him tell you about that ------

* * *

Yes, rats it is. Most of us don't think of rats, especially the common brown or house rats, as part of nature. We generally think of them in connection with houses. They are a sort of undomesticated domestic animal. They seem to prefer to make our homes, and our barns, and our stables their homes.

There is a reason for that. We treat rats better than their enemies in the open treat them. Hawks and owls, and other such birds of prey often make short work of rats.

And no wonder they take shelter in our buildings! As a rule, they are much safer in our places than in the wild. The cats we keep don't give us much protection. Cats of real value as ratters are rare.

Yes, a lot of folks furnish food and shelter for rats. And the more food available, the more rats. Well-fed rats mature quickly, and breed often, and have big litters. Poorly fed rats, breed less often and have smaller litters.

In this part of the world, rats usually average about ten to the litter. Normally, rats breed six to ten times a year, and start breeding when only three or four months old. Figure it out for yourself. A friend of mine did. He found that at that rate one pair of rats, all breeding uninterruptedly and without losses, would increase in three years to nearly 260,000,000.

I was telling another fellow about that, and he said: "Yes, that must be the pair of rats that started a family on my place three years ago."

He was complaining that rats had caused him big losses in chicks and eggs. Of course, that kind of damage is easy to see. Much more so than the slow, steady drain of grain and other farm products.

Mr. James Silver, of the Division of Predatory Animal and Rodent Control of the Biological Survey, tells me that rats every year do $7,000,000 worth of damage to corn in storage alone. Rats are expert climbers too, and often damage standing corn in the fields.

Rats feed on all kinds of animal and vegetable matter. They attack crops when they are just planted, while growing, during the harvest, in storage, and during transit, and in the mill, and in the store, and in the home. And they ruin by pollution many times as much as they eat.

Figuring that there are only as many rats in this country as there are people, and that each rat destroys $2 worth of property a year, Mr. Silver estimated that rats are doing a damage of more than $200,000,000 a year in this country alone.

"Pity, the Pied Piper of Hamelin couldn't have broadcast that music by radio," I remarked.

"I'd rather trust to Red Squill than the Pied Piper," he suggested.

"Red squill is deadly to rats, when they eat it, and they eat it freely. Domestic animals and human beings don't like it, but even when they do get an overdose of it, it doesn't do them much harm. For that reason, powdered red squill is especially good to use to poison rats about poultry plants, and barns, and other farm buildings, where there is danger of farm animals gaining access to the baits.

Then, too, one of the surest ways of killing rats in their burrows in the ground, and under tight floors, is by forcing calcium-cyanide dust into the burrows by means of a dust pump. The dust forms a very deadly gas on exposure to the air. Unlike red squill, it isn't deadly to rats only. It is fatal to man and other animals even in very small quantities and so should only be used in the open air.

Rats can also be killed in their burrows by the exhaust of an automobile. By attaching a garden hose to the exhaust pipe, and letting the auto engine run at moderate speed for ten minutes or more while directing the hose into the burrow, you can do an effective job of gassing.

However, you will find the different ways of getting rid of rats in Farmers' Bulletin No. 1533-F on "Rat Control." That bulletin tells not only how to kill rats, but how to keep them out. Mr. Silver wrote that bulletin himself and gives more details there than we could get into a short talk.

Buildings have to be built right to keep out rats. Every new building should be rat-proof, whether in the town or country. And much can be done to protect even old buildings in cities against rats.

Rats need food and shelter. Where they can't get food and shelter, they can't live long.

Mr. Silver says that rat-proofing clauses in local building ordinances and more strict regulations in local sanitary codes, including the proper

collection and disposal of garbage and prevention of trash and waste accumulations on private premises, will do more to bring about permanent reduction in the number of rats than any other measure.

Now, we have been very nice in speaking about the rat. But the rat is not nice. Our common brown rat is a filthy, disease-carrying beast. For hundreds of years, man has been living with rats and at the same time fighting them. The terrible "black death" of the Middle Ages is now believed to have been the bubonic plague spread from country to country and city to city by our common brown rat. Twenty-five million persons are estimated to have died in Europe during that epidemic.

Rats are highly migratory. They move from house to house, from farm to farm, and from community, to community and from State to State, and country to country. You should do everything you can to protect your life and property from these filthy disease-spreading robbers. Prevent trash accumulating. See that the garbage pail has a tight-fitting top. Rat-proof your buildings. Trap them out, gas them out, or poison them out.

Even when you kill off all those on your own premises, more may come in from the neighbors. For permanent results, the whole community should cooperate. County-wide anti-rat campaigns are very valuable, because they clear many farms of the pest at the same time, so they won't immediately become reinfested from adjoining premises. Some cities now carry on anti-rat campaigns as a regular thing each year.

During the cold winter months, rats concentrate around the farm buildings. So right now is the time to send for that bulletin and lay your plans for an effective anti-rat campaign.

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ANNOUNCEMENT: The bulletin on "Rat Control" is Farmers' Bulletin No. 1533-F. It contains suggestions for rat-proofing buildings, for gassing and poisoning, and for rat trapping. You can get a copy free of charge by writing either to Station_____ or to the United States Department of Agriculture, at Washington, D. C. Just ask for Farmers' Bulletin No.1-5-3-3-F, on Rat Control."

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WITH UNCLE SAM'S NATURALISTS September 25, 1931

NOT FOR PUBLICATION

Speaking: ten minutes.

ANNOUNCEMENT: Every other week at this time our wilds man tells us about his visits with Uncle Sam's Naturalists. This week, however, he went to the Forest Service to see just what the Forest Service does to protect our forests from fire, and how it does it. Well -

If there is anything likely to make a lover of the wilds wild, it is a forest fire. I guess you have all been reading about these big fires we have been having. A month ago, it had already cost the Government way over a million and a half dollars to fight the fires in our Western National Forests. The fires had then burned over nearly 400,000 acres of land on the National Forests. While that is less than the average area lost during the last five years it is almost twice as much as was lost during the entire calendar year 1930. Outside the National Forests huge areas have been devastated, human lives have been lost, homes have been destroyed, even villages burned up, and huge sums have been expended in the endeavor to stop fires that for one reason or another grew big and unmanageable.

On the National Forests only a few fires get away and do serious damage. The regular force of rangers and summer fire guards, together with men drawn from road and improvement crews, catch all but a few of the fires in their small and harmless stage. Once in a while a fire is not attacked with sufficient speed in its early stage and it gets away; or perhaps the country is covered with a pall of smoke and a new fire is not discovered until after it has started to make a run; or occasionally a fire is unmanageable before any human being could possibly reach it. In one recent instance a fire starting near Newport, Washington, just outside the National Forest, supposedly by the explosion of a moonshiner's still, spread so rapidly from the time it started at eleven o'clock one morning that it had covered 24,000 acres by four o'clock that afternoon. Fire fighters never had a chance to catch this fire until after it had made its first run. The real battle was lost when this fire started. The only way to have prevented this fire from sweeping in as it did into the National Forest and doing irreparable damage was to have found some way to prevent the fire from ever starting. In order to control this fire and stop its further spread, the fire fighters had to construct some ninety miles of fire lines. They did this in record breaking time - ninety miles of line made in four days through rough timbered mountain country is a construction and fire-fighting job of magnitude.

In the East, fires have not been troublesome this summer. Normal rains have occurred and fires do not start or are easily caught. Very differen from the way it was in the East in the summer of 1930 during the terrible Eastern drouth.

About 64 per cent of our country's forests now have organized protection against forest fires, Mr. C.E. Randall, the information man of the U.S. Forest Service, tells me. Of course, they have fires where there is organized protection. But the area burned by forest fires on the protected area is less than one-eighth of the area burned on the 36 per cent yet to be protected. That shows it pays to protect.

The first thing in protection is to have an organized system of detecting the fires. For that reason, on the National Forests the Forest Service has lookout stations located on high ground to spot fires. The idea is to locate the fires as soon as possible after it starts, and get men to it to put it out before it does much damage.

For that, telephone and other communication lines are needed, so the lookout can report and the ranger or warden get word to rush the fire fighers to the scene of danger.

In order that the fire fighters may be prepared to handle the situation, the necessary tools and supplies must be located at strategic points throughout the forest. And, of course, there must be an adequate system of roads and trails through the forest so the fire fighters can reach the fire readily.

Last year the Forest Service perfected and tested portable receiving and code transmitting radio sets each weighing 79 pounds including batteries, antennae, and all containers needed for moving the equipment in trucks or on pack animals. Although it was found that radio communication is interfered with by rugged mountains and the presence of tree growth, the interference is not enough to prechide the beneficial use of such equipment. These portable sets enable a man in the woods remote from a telephone line to listen to voice transmitted from a central station on the National Forest and the man in the woods can reply by use of telegraphic code. Further tests are being made of an ultra light weight set weighing perhaps less than ten pounds with batteries and all equipment, which will both receive voice radio messages and send code replies.

Aeroplanes have been used in forest protection on our Western National Forests since 1919. While their usefulness is not so great as is popularly supposed, they have a contribution to make to forest protection. During the present summer more landing fields on meadows and on fields cleared of timber for this purpose are available than ever before. In some instances fire fighters are being transported by planes.

You see, many of our forest fires in the West are caused by lightning. Sometimes, one electrical storm will start three or four hundred separate fires.

Most forest fires, however, are caused by human carelessness; a burning match, a smouldering cigarette, or a spark from a camp fire not properly put out, may start a fire in the dry leaves and brush. In fact, some of the

National Forests are closed to smoking during bad fire seasons. Some are even closed to camping when the danger gets too great.

Naturally a lot depends on the weather. For that reason, Weather Bureau and Forest Service experts are working together in various places in the attempt to make predictions of lightning storms and important changes in weather conditions more reliable and more useful.

Fires are fought in many ways, depending on the nature of the ground and the nature of the timber and inflammable debris in which the fire spreads. As a rule a barrier or narrow "trench" must be dug or scraped so that a foot or more of mineral soil is exposed. This forms a base from which to start backfires against the approaching main fire. Clearing away of timber logs and brush so that this narrow trench can be made is often the biggest part of the job.

Machinery is being used in fire fighting more and more. Where the country is not too rough, plow-like tools pulled by tractors are very efficient in making the trench at a rapid rate. Such equipment is often able to crush through undergrowth that would have to be cleared by hand if the trench were to be made by hand. Where the country is too rough for tractors, horses and plows are being used with increasing success. When men and animals know how to do it, a single heavy horse and a light reversible plow will do the work of fifty men in trench-making on ground so rough that the average person might say that a horse could not even stand up on it.

Standing dead trees, or "snags", are among the worst fire hazards of the forest. They not only catch readily, but form a pillar of fire from which flaming brands may be hurled by the wind and start new fires past the fire lines. When such trees are rotted and hollow, they are veritable chimneys for sparks. So another job in fire protection is to cut down such standing dead trees, so they will rot more quickly and be less of a menace to the sound timber.

In the southern forests, the old custom of woods burning still persists with many people, the usual result is that fire set perhaps to burn over a few acres of pasture spreads over extensive and valuable forest areas and results in serious damage to timber, especially to young forest growth much of which may be destroyed.

So the United States Forest Service, in protecting the national forests, has not only to maintain an elaborate system of lookouts, and often recruit a small army of fire-fighters, and manage the forests so as to decrease the danger of fire, but it has to educate the hunter, and the camper, and the tourist, and the woods-burner.

ANNOUNCEMENT: Our Wilds Man will be back in two weeks to tell us more about the visits he makes with the naturalists of Uncle Sam, in the United States Department of Agriculture.

UNITED STATES DEPARTMENT OF AGRICULTURE

Radio Service

OFFICE OF INFORMATION

★ OCT 13 1931 ★
U. S. Department of Agriculture

WITH UNCLE SAM'S NATURALISTS. RELEASE Friday, October 9, 1931

NOT FOR PUBLICATION

ANNOUNCEMENT: Now for our visit with Uncle Sam's Naturalists of the United States Department of Agriculture. Our Wilds Man is back from a visit to the tall timbers with some of those naturalists --- and he has some tall stories to tell us --- Isn't that right, Mr. Wildsman? -------

*****

Tall trees remind me of that peom of Tom Hood's ---

You remember. I remember. ---

"I remember, I remember
The fir-trees dark and high;
I used to think their slender tops
Were close against the sky:

It was a childish ignorance,
But now 't is little joy
To know I'm farther off from heaven
Than when I was a boy." -------

But from what Mr. Harry D. Tiemann, of the Forest Products Laboratory, says it would seem that some of the trees may have actually been taller in the old days.

Mr. Tiemann has been collecting information on the dimensions of trees. --- And he would be glad to get more from any of you who happen to know about any big trees --- Our information of big trees past and present is not as complete as it might be.

Then, too, we sometimes suspect that some of the tall stories about tall trees felled long ago may have stretched the measurements. In the long ago, in most cases, folks estimated the height of the tall trees by the eye or they just guessed at the height. It seems probable that in some cases they made a bad guess. In other cases, the trees seemed to have continued to grow in length long aftér they had been used up for lumber.

Of course, when we talk of tall trees, most of us think first of redwoods. Well, the tallest known redwood is one still standing in Bull Creek Flat. Fairly reliable measurement places the height of that tree at between 359 and 368 feet. Mr. Tiemann says taller ones may have existed, but there is no record.

If that is the tallest redwood, the record for tall trees will have to go to "the fir-trees dark and high." In 1900 a Douglas fir was cut down and measured with a steel tape. And it measured 380 feet. That was a real tall tree!

But if the measurements are to be relied upon, that tree was topped by a Douglas fir, felled near Vancouver, British Columbia, 15 to 20 years ago. That tree was said to have been 417 feet high with a stump diameter of 25 feet. That stump diameter is all right. There is a photograph by which that has been checked. But that height figure has not been positively established. If it is correct, it is by far the tallest tree on record.

Redwoods have a bigger diameter at the base than do other big trees, as a rule. We have redwoods living now with a 30 feet diameter at the ground. That is exceptional, however, and redwoods have a big root swelling which makes measurements misleading.

A redwood felled in 1853 measured 25 feet in diameter inside the bark 6 feet above the ground. Forty-nine people danced on the stump of that tree at one time, and I venture to say some of our young folks today could not only squeeze on a partner for that odd dancer, but might even add a few more couples. Big as it was at the ground, that redwood was just 302 feet high. That other fallen tree in that same grove, the tree which was called the "Father of the Forest" is estimated to have been 400 feet high, but there are no accurate measurements to back up the story. And when you speak of trees being 400 to 500 feet high, these scientific foresters are a bit skeptical. They want the proof.

But the redwood and the firs are not the only sizable trees. The great cypress at St. Maria del Tule, Mexico, has a diameter of 40 feet at the ground, and 35 feet five feet above the ground. As cypresses grow, it is pretty tall too. It is about 150 feet high.

And speaking of cypresses, Extension Forester Robert Moore of Louisiana State University recently reports that one was recently cut in Amite River Swamp, in Livingston Parish, Louisiana, which measures some 7 feet 9 inches across the stump, and has a saleable length of only 86 feet 8 inches.

How long do you suppose it took to grow that tree? The foresters counted the annual rings in the stump of that cypress. By starting at the bark and counting the rings in to the center, they could calcualte the age, with a fair degree of accuracy. And they found it was some 1,300 years old. You see, these giant trees don't grow to their tremendous size in a few years. That tree was considerable of a giant when Columbus discovered America. Fact is, it might be interesting to get out your histories, and trace back the course of events and notice just what was happening in the Old World when that young Louisiana cypress was getting its start. And some of our redwoods now standing were a thousand years old or more when that particular cypress was a seedling.

However, we were talking about the size not the age. Next to firs and redwoods, the eucalyptus trees of Australia seem to tower highest. There are some growing now which measure 300 to 310 feet in height. The tallest known eucalyptus of authentic measurement was 346 feet high. The Australian eucalyptus, however, are very slender. They are seldom more than from 8 to 12 feet in diameter.

But for that matter, the largest known lumber tree in the world, a redwood recently found in Big Lagoon, Humboldt County, California, is only 20 feet in diameter 5 feet above the ground and 308 feet high. But that one tree has enough lumber in it to build 22 average sized houses.

Another kind of the world's big trees is the Kauri tree of New Zealand. It is a peculiar-looking tree. --- At least, it is to our way of thinking --- The Kauri tree has a barrel shaped trunk and a top like a feather duster. There is practically no taper to the trunk. So you can readily understand, that kind of tree has a lot of lumber in it. One in the Tutamoc Forest is said to be one 22 feet in diameter and 100 feet high to the first branch. It scales 220,000 board feet, as against 361,366 board feet of that record holding big redwood, of ours.

And while we are mentioning big trees, I guess we will have to include the famous banyan trees of India. They have such a peculiar way of growing, it is hard to think of them in the same way we do other trees. You know a banyan tree has many trunks and spreads over an immense area like a forest. There is one banyan tree on the Nurbudda River in Western India which measures 2,000 feet around the outside of its many trunks. That one tree has 350 big trunks and 300 small ones, beside the main central trunk from which all those others originated.

But when we are talking about giants among trees, it is well to remember that our smaller kinds of trees have giants after their kind.

The Superintendant of the Great Smoky Mountains National Park in North Carolina and Tennessee, recently reported a living chestnut tree 30 feet in circumference, and a tulip tree which measures 18 feet around.

Also a gigantic grapevine 60 inches around at a point 12 feet above the ground. That one grapevine is being supported by five big trees, and the botanists figure it had started its upward climb before Lord Cornwallis surrendered at Yorktown.

Maybe in various parts of our country there are many giants not down in the records. If you know of any other trees of exceptional size, The Forest Products Laboratory at Madison, Wisconsin, would like to get reliable information about them.

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ANNOUNCEMENT: Well, there certainly seem to be some giants left in the woods yet --- Two weeks from today, our Wilds Man and the audience of this Station will again enjoy a visit with Uncle Sam's Naturalists of the United States Department of Agriculture.

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UNITED STATES DEPARTMENT OF AGRICULTURE

Radio Service

OFFICE OF INFORMATION

NOV 6 1931
U. S. Department of Agriculture

WITH UNCLE SAM'S NATURALISTS

RELEASE Friday, October 23, 1931

FOR BROADCAST PURPOSES ONLY

ANNOUNCEMENT: Now let's spend a few moments with Uncle Sam's Naturalists of the United States Department of Agriculture. Today our Wilds Man brings us some interesting facts about some of the animals and trees which are a part of that facinating struggle we call outdoor life --- Well, Mr. Wilds Man? ---

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There are a number of points to my subject today.---- sharp points; barbed points.

Some of those points are on the quills of the friendly porcupine -------

But before we go any further, let's get one thing right. Porcupines don't shoot or throw those quills at their enemies. That's the idea I used to have. I used to think those big, clumsy-looking rodents had some way of propelling quills from their body like so many darts or javelins. Mr. Vernon Bailey, a field naturalist of the U.S. Biological Survey, set me right on that.

He knows his porcupines, and he says what really happens, is that Porky thrashes out with that stout tail of his, and some of those spiny quills are often driven into the flesh of the attacking animal, Barbed as they are, they pull out of the porcupine's tail by the roots before they will come out of the animal that gets stuck. In fact, the more the victim tries to get those barbed quills out, the further they penetrate into its muscles. Sometimes an animal gets porcupine quills in its nose or mouth or tongue. Those parts get swollen and prevent the animal from eating and it starves to death.

Most animals have a wholesome respect for the porcupine and don't push the attack. But some dogs will go right in where more cautious animals fear to tread. When a dog gets a mouthful of those little quills, about the best thing to do, is to shoot the dog.

Yet the porcupine is not really vicious. Mr. Bailey says it is a timid animal, and a rather friendly sort of fellow when it gets to know you.

Those hairs on his back and side that have developed into quills are just his defense equipment, for use when in actual contact with an enemy. With those short legs of his, he can't run away. His ordinary speed is about the same as that of a turtle. If it had not been for those bristling quills, porcupines would probably have disappeared from the face of the earth long ago.

The damage porcupines do other animals with those slashing tails of theirs is small compared to the damage they do man when over-abundant in feeding upon crops and trees! There are two kinds of porcupines in this country--the yellow or haired Western porcupine and the white and black or Eastern porcupine. Both are brownish black or black in general appearance -- the yellow or white is just the trimmings, and both range over the higher lands of the northern parts of our country and way up into Canada, and both have pretty much the same habits of damaging forest trees. In fact, in some places, the porcupine damage to trees is second only to that of fire.

During the spring and summer months, porcupines feed on juicy ground vegetation, but during the fall and winter their diet is largely of bark and leaves of coniferous trees.

During the late summer, and fall and winter months they often completely girdle the main leaders or boles of trees by eating the inner layer of bark. It seems to take a piece of bark about the size of a man's hat for one full meal for a single porcupine. Many seedlings up to give years old are completely stripped of bark and the bigger trees are sometimes damaged so much that they die. More often, the damage results in the production of a weakened bushy-topped, or spike-top, tree that is useless for commercial purposes.

In the humid Northwest with the first cold fall rains, porcupines begin a slow deliberate migration from mountain meadows and valley farms back to the shelter of cliffs and lava rock dens, from which they issue forth to feed on the bark of nearby trees. In the Southwest, the porcupines move down from the higher elevation to congregate for the winter in the shelter of the forests. They stay in the trees feeding off the bark and so girdling many of the branches and the upper part of the tree bole. Deep snow sometimes holds a porcupine to a single tree for one to three months. With the melting of the snow, they start back to ground feeding.

Where there are no rock outcroppings suitable for dens, the migration routes can be traced by the "porcupine trees". That is, in traveling, they feed upon ground vegetation by night, and seek safety during the day in certain trees that have been used before or by other porcupines passing over the same route.

These rest trees show some slight damage, but not the heavy damage of trees used by porcupines for a winter home. They offer a place of attack for people interested in saving the timber. However, there is a Leaflet, No. 60-L, on "Porcupine Control in the Western States," which gives valuable information to those interested in that phase of the subject.

And speaking of control of rodents and damage to trees, let's not overlook the field mice. They are not so big as the porcupines, and maybe not so interesting. But they have bigger families, have them oftener, and range from one end of our country to the other and beyond.

The damage they do varies a great deal from year to year, depending upon how many there are, their food supplies, and weather conditions. You can set it down that the damage they do to pastures, and

forage, and grain, and other crops, and tubers, and small fruits, and flowering plants, and shrubbery amounts to millions of dollars a year. And the man who has raised orchard trees to the age of bearing, only to see them wither and die under the ravages of field mice can't sympathize with the views of the kind-hearted plow-boy poet who refused to swat a field mouse when he had a chance.

In this broad land of ours, there are a great number of different kinds of closely related field or meadow mice. Their numbers go up and down suddenly and often seemingly without notice, owing to the varying birth rate, the effect of disease, the abundance of food, and the extent to which they are preyed upon by their enemies among wild animals, and birds and snakes. If there are any around, they are a constant menace in the orchard.

As a rule, they do the biggest damage to trees in the winter under cover of snow. Damage from meadow mice is usually more severe during a hard winter with deep snow than during a mild one. But that is one of those general statements, you can't be sure will apply in your fruit trees. There is one record of 5,000 trees girdled in a Kansas orchard before the middle of December during a mild open winter. 1,300 trees were killed in one orange grove in California, by mice during a dry fall. But as a general rule, winter damage is worse.

Mice seem to prefer apple trees to some extent, but they are not very particular. They killed 3,000 pear trees in one Connecticut orchard one year and 500 young peach trees. They prefer the juicy bark of young trees when they can get it, but no tree is immune when food is scarce.

Mice completely girdled $10,000 worth of trees in an orchard near New York City, including a number of 50-year-old trees. Trees don't grow too old to be damaged by mice when conditions are favorable for mouse damage.

But "Mouse Control in Field and Orchard" is explained in Farmers' Bulletin No. 1397-F. In the eastern half of the country, besides the meadow mice there are the little stumpy-tailed pine mice. It is important to distinguish between these two, because methods of control that will work for meadow mice won't work for pine mice. Pine mice you see work underground and attack the roots, whereas the meadow mouse, although it makes use of shallow tunnels and underground nests feeds mostly at the surface. But these differences are all pointed out in Farmers' Bulletin No. 1397-F on "Mouse Control in Field and Orchard." In making plans for permanent control of field mice, remember to protect their natural enemies. Owls, and hawks, and gulls, and magpies, and foxes, skunks, raccoons, opossums, weasels, and shrews are included in the enemies of field mice. Also such snakes, as kingsnakes, bullsnakes, and blacksnakes.

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ANNOUNCEMENT: You can get Farmers Bulletin No. 1397-F, on "Mouse Control in Field and Orchard," by writing either direct to the United States Department of Agriculture at Washington, D.C., or in care of this Station. Leaflet No. 60-L, on "Porcupine Control in the Western States," can be obtained in the same way. These publications are free as long as the supply lasts.

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UNITED STATES DEPARTMENT OF AGRICULTURE

Radio Service

OFFICE OF INFORMATION

★ NOV 14 1931 ★

WITH UNCLE SAM'S NATURALISTS. FRIDAY, November 6, 1931.

FOR BROADCAST PURPOSES ONLY.

ANNOUNCEMENT: Well, let's get out in the woods again. Every other week our Wilds Man leads us across country for a close up of Nature as it has been revealed to him by Uncle Sam's Naturalists of the United States Department of Agriculture ----- Well, Mr. Wilds Man, go ahead and we'll follow ----

******

"Boughs are daily rifled
By the gusty thieves
And the book of Nature
Getteth short of leaves."

So sings the poet. But you may gamble on it, that he didn't write those lines while walking through the weeds. Kicking around through the litter on the forest floor is about the last place to think of the book of Nature getting short of leaves.

But I guess a lot of folks think of the leaf's job being done when it falls of the tree. Far from it. There are several volumes of Nature's stories right there on the forest floor. I am just going to touch on one of them; which is by way of being a mystery story. And as in most good mystery stories, the detectives have recently come in and cleared up the mystery.

Of course, you all know that the leaves and litter on the ground around the trees catch a lot of the rain water that falls on the forest. In fact, a good bit has been said, first and last, about the effect of our forests in helping to control floods by holding the water back, and feeding it into the streams more slowly than the run-off from bared and cultivated ground.

The leaf litter on the ground under the trees is the most important part of the forest in that respect. Foresters compare leaves and litter to a big sponge which soaks up and holds the water from running quickly away to swell the floods.

And it does act as such a sponge, or vast shallow reservoir if you will. Mr. H. H. Bennett, chief of the soil erosion investigations of the Bureau of Chemistry and Soils, tells me that until recently that was supposed to be the chief function of the forest litter in controlling floods.

But now we know that important as that is, it is not the chief thing. Recently at one of our Soil Experiment Stations, the run-off of rainwater was measured from a plot which had been burned over, and from another which still

had its natural leaf and litter covering. And it was found that the burned over plot, on which the litter and other vegetative cover had been destroyed, lost last year 80 times as much of the rainfall by run-off as the plot of similar soil and slope which had not been burned.

That was certainly striking evidence of the great water holding capacity of the unburned forest floor, but the specialist in charge of the work was skeptical about the leaf litter being responsible for all that difference.

Mr. Bennett tells me that all the leaf litter from a measured square of that forest floor was gathered up, and put in barrels of water. Having soaked up all the water it would, the material was then weighed. This done, the litter was carefully dried and weighed again. Of course, the difference in weight represented roughly the entire weight of water the litter had been able to soak up.

Well, the expert got busy with pencil and paper and figured out on that basis how much water could have been held by the litter covering that test plot of forest land. And he found the total amount way, way short of the amount which the measurements had shown to have remained on the land.

It didn't take long to solve the mystery. If the water retained was not in the litter, it must be in the ground under the litter. Just as much rain had fallen on the burned-over plot and the soil, the slope and forest cover were the same for both plots. When the bare plot was dug into it was found that the water had soaked in only a little way below the surface. Digging down into the soil under the litter-covered forest floor, it was discovered that the water had permeated down, far, far down into the earth. That natural forested area had absorbed 100 tons of rain per acre more than the burned-over land.

Why, you may ask, did the water sink in on the leaf covered soil and not on the same kind of soil which lacked cover?

Well, an old irrigation farmer might give you the clue to that. He would probably know from experience that some soils won't soak up muddy water readily.

What really happens, Mr. Bennett says, is that silt in the muddy water actually seals up the pores in the soil so that the moisture can't percolate further into the ground. Rain falling upon the bared forest floor quickly washes up soil, then the muddy water clogs the tiny channels which would let clear water into the ground. In other words the big thing the forest litter does is to act as both a physical protector of the soil and as a tremendous filter to keep the water free of silt and let it sink into the ground.

In the forest leaves and litter, in the prairie or open country grass and bushes serve to check the flow of water and their accumulated refuse to filter this so that clear water can sink into the soil. Some of our older men, who can remember back to the early conditions in our Prairie States before farming came in on a big scale, say that the matted turf of the prairies in many places hung like canopies over the banks of streams. And those streams carried clear water the year around. Even if in some cases those stories have to be salted down a bit, it is still evident that

there has been considerable change. Those streams now are more often dry in summer and when the rains come they run thick with muddy water.

You see, Nature, left to herself, provides a carpet of vegetation to check and filter the water and to let it soak in. But when we come along and clear the land, and bare the soil, and plant row crops on it, much of the water which natural cover conditions held back, goes to swell the floods, Not only more water but water filled with the best top-soil from our farms rushes down the streams to add the extra inches to the flood which may mean disaster.

And remember even our forests lose much of their water holding power when the brush and leaf litter on the floor of the woods is destroyed. Overgrazing and fires often add water to our floods.

Some people claim that back in the days of the early pioneers there were floods equal to any we have had in recent years. But Mr. Bennett points out that those stories of floods are vague and unreliable and sharply contradicted by the experimental evidence now being obtained, although recognizing, of course, that there have always been floods.

The water-holding capacity of forests and grass-lands has been demonstrated. As Mr. Bennett indicates, the terracing of fields, and the growing of trees, grasses and shrubs on idle lands and areas too steep for cultivation, and upon soils that are highly susceptible to washing, will do much to reduce floods by decreasing the run-off and washoff from many land areas.

Protection of existing forests and woodlands from overgrazing and damage by fire, will also help. Ground-fires burning through the woods and seemingly doing little damage to the trees burn the leaf litter which plays such a big part in checking run off of rainwater.

Those Autumn leaves, you see, have a big job ahead of them this winter and next spring.

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ANNOUNCEMENT: Every other Friday, Station ---- presents these results of visits with Uncle Sam's Naturalists in the United States Department of Agriculture.

UNITED STATES DEPARTMENT OF AGRICULTURE

Radio Service

OFFICE OF INFORMATION
NOV 17 1931
U. S. Department of Agriculture

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WITH UNCLE SAM'S NATURALISTS Friday, November 20, 1931

NOT FOR PUBLICATION

SPEAKING TIME: 10 minutes.

ANNOUNCEMENT: This is the day and hour for our regular Friday visit with Uncle Sam's Naturalists. Our Wilds Man has been talking with men in the Forest Service, United States Department of Agriculture, trying to get the facts on the future of the United States' wood supply. Where do we stand in reference to our stand of timber? All right, Mr. Wildsman, you tell us:

******

I can remember the time when one of the great concerns of the farmer was to get the timber OFF his land. That, in the country where I lived, was a time of clearing the land. And clearing the land was no small job. But a big change has come in the timber supplies of this country and now a whole lot of farmers would like to see more timber ON their land.

The same change has come about in the hills and in the forests. America's great stands of virgin timber--once thought INEXHAUSTIBLE--have been used up so fast that already the last extensive stands are being tapped. The United States is a great wood-using nation. Our newspapers alone eat up thousands of acres of timber every year. That morning or evening paper you buy for a few cents is printed on a wood-pulp paper and you have to have trees if you're going to have wood pulp. That's only one example of the country's mammoth appetite for wood and that wood has to be supplied somehow--unless we can find a good substitute. The trouble is, virgin timber is practically irreplaceable because of the length of time necessary to grow material of the highest quality. You can't grow a tree over the week-end, you know.

I was talking this over with some of the men in the Forest Service of the Department of Agriculture the other day and they gave me some figures. The forest land of the United States, they said, amounts to about 730 thousand square miles altogether. About 150 thousand square miles is managed for permanent timber production under public ownership, Federal, State, and local. The other 580 thousand square miles-- an area larger than France, Belgium, the Netherlands, Denmark, Germany, and the British Isles, by the way-- is privately owned. This privately owned forest land supports industries giving employment to more than a million people and turning out each year wood products valued at 2 billion dollars. This is enough to supply domestic needs and furnish wood products worth about 200 million dollars to foreign countries.

That sounds very impressive-- that sounds like very good business. That sounds like America's wood pile is a very big proposition--- and it is.

But the trouble is, only a small portion of this woods land is now being handled so as to produce timber continuously. The greater part of the land is gradually drifting into idleness, producing so little that it is a burden to its owners and to the communities within whose territory it lies. Some 125 thousand square miles have already stopped being productive and a much larger area is only partly productive. The UNPRODUCTIVE land, the Federal foresters say, is being abandoned not because of any serious difficulty in keeping it PRODUCTIVE, now because no way to keep it productive is known, but because its owners doubt whether timber-growing will pay. Up until very recent years, as the virgin timber in one region was cut, there was always another virgin supply just over the hill or in the nearby country. But that's not so any more.

Now let's take a look at another side of the question. Government experts say that more wood is used in the United States than in any other country. WE CONSUME AS MUCH TIMBER FROM TREES LARGE ENOUGH TO SAW OUT LUMBER AS ALL THE OTHER COUNTRIES COMBINED--- or about 13 BILLION cubic feet in all. The United States leads the world in the manufacture of many products made wholly or partly of wood. With only 6 per cent of the world's population, this country has 35 per cent of the world's railway mileage and for the transportation industries alone--including automobiles and railroads--we use nearly as much saw timber per capita as is required for all purposes in Great Britain, Germany, or France. We use immense quantities of wood every year for making shipping and storing crates, boxes, and barrels. Great forests are used up every year to make pulp for our paper supply. The United States is known all over the world as the land of wooden houses. We are cutting from our forests about 200 cubic feet of wood every year for each man, woman, and child in the United States.

Of course, the United States isn't alone among the nations of the world when it comes to using wood. Some folks think that wood is more or less out of date and that it's rapidly being replaced by cheaper materials or better materials. That doesn't seem to be so. Newsprint and other woodpulp products--automobiles--phonographs--radio cabinets--and many other articles requiring large quantities of wood, have come into extensive use within a generation. It seems that no sooner do we find substitutes for wood than new uses for wood arise. Many foreign countries have learned the truth of <u>that</u>.

China is the classic example of a nation that has suffered from an exhausted wood-pile. Some 2,500 years ago, China was abundantly supplied with forests. The population increased rapidly and the people cut the timber as it was needed, wastefully and without thought for the future. At first, the Government seldom or never interfered. Land clearings--- wasteful cutting--repeated forest fires, continuing throughout many centuries, gradually pushed the forests back until they are confined to the least accessible parts of the mountains today. To get timber down to the main consuming centers of the country takes from 6 months to 3 years. This has put timber into the luxury class in China and the general public can't afford it. In many districts, timber large enough to make boards is so scarce that practically none is used save for the manufacture of coffins.

Let's carry the story a step further. Since wood for building or for fuel can't be gotten, you'd naturally expect the Chinese to turn to substitutes, such as coal, brick, cement, and steel. The country has these and

other mineral resources in plenty. But without timber, it's impossible to use the substitutes. The few coal mines that are developed depend largely on imported timber for props, lagging, and other needed construction material. The railroads that carry the coal run on wooden ties brought in from Manchuria, Japan, or North America. Small native iron foundries use charcoal brought for many long miles on boats and on men's backs. Domestic iron and coal, therefore, are produced only in small quantities and are so costly that they can hardly compete in the seapart cities with the iron and steel brought from North America and from Europe.

Well, there's the lesson--- there's the situation in a country that wasted its wood supplies. What's the moral, so far as the United States are concerned?

But with all this, we are still going to need plenty of wood in this country. Even if our PER CAPITA consumption should fall as low as present European standards, the increase in population which is likely to take place in the next 50 years will keep our timber requirements at a level little, if any, below our present timber needs. Furthermore, it often takes wood to make the very things which are designed to take the place of wood. The coal mines of the United States alone consume a billion board feet of lumber a year. And of course we are constantly increasing and broadening the uses for wood. As our cities grow, more and more wood will be needed to make the containers in which their food is shipped in from the producing sections.

All this brings us down to a rather obvious moral: GROW MORE WOOD OR ELSE USE LESS. We will always need our forests. We should, therefore, conserve and maintain them.

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ANNOUNCEMENT: That was the Wilds Man you just heard, taking you to Washington for your regular weekly visit with Uncle Sam's Naturalists. His talk is broadcast by Station_____ every Friday, in cooperation with the U. S. Department of Agriculture. Write to the Forest Service of the Department, Washington, D. C., if you want still more facts and figures on the future of America's wood-pile.

UNITED STATES DEPARTMENT OF AGRICULTURE

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WITH UNCLE SAM'S NATURALISTS.

Release Dec. 4, 1931

NOT FOR PUBLICATION

Speaking Time: 10 minutes

ANNOUNCEMENT: Our Wilds Man has been telling us about the creatures of the wild, as he has found out about them from the Uncle Sam's Naturalists of the United States Department of Agriculture. Today, instead of telling us about animals and trees, he is going to tell us about the men who protect them both----Go ahead, Mr. Wilds Man, tell us about the forest rangers---

* * * * * *

The forest ranger has a job which runs 365 days to the year. At times, it runs 24 hours a day.

He has plenty to do; not only himself, but in looking after other folks.

Anyone who starts talking about forest rangers is taking in a lot of territory. We've got national forests scattered through 30 different States and in Alaska and in Porto Rico. They tell me, at the United States Forest Service that there are almost a thousand of these forest rangers on 151 national forests.

Forest ranging is a man's job. My friend, Bill---I won't mention his other name---is a district ranger on an Oregon west side national forest.

If you could ride out there with him, as I did, you'd never guess there were hundreds of other forest rangers in the service. Out there on the rough trail, with the high peaks towering over us, and a deep canyon yawning almost at the horses hoofs, it seemed to me that Bill was as near alone with Nature, as a man ever gets in this world. Bill knows his Nature too, from the birds which soar among the peaks to the litter which carpets the ground under the trees, which cover most of the 280,000 acres of land in his ranger district. There are considerably more than five billion board feet of timber Bill has to protect, he tells me.

As we were climbing up one of those trails, Bill noticed a bad place in the path, and dropped a remark about fixing it up, and I began to realize that a forest ranger does something besides range around through the woods.

Although there are no towns, or ranches, or settlements in all Bill's district, the works of man are not altogether shut out of his Eden. There are 38 miles of main roads, and 688 miles of trails and ways, and 140 miles of telephone lines in that district of his. What's more he is responsible for keeping up all those telephone lines, and trails, and ways, and roads. Fact is, his 280,000 acres are not well enough protected yet. He has before him quite a job of building new telephone lines, new cabins, and bridges, and new trails.

Going along there together, with Bill telling me all this, I began to think of the forest ranger's job as chiefly that of a road engineer, of the type of those "Pioneer souls" who blaze the paths where "highways never ran."

That is, I did until we came to some of those mountain meadows or open grassy ridges. Then Bill turned his attention to the condition of the forage plants as they had been left when the sheep were taken off this summer range. Then I had to revise my idea of a forest ranger. You know the Government grants permits to ranchers to use parts of the national forests for grazing their stock, their cattle and sheep. Bill's district, provides summer range for 5500 head of sheep. Bill has to check up on the sheep entering the forest, and the condition of the range, so as to prevent over-grazing of the land. In fact, he is a sort of boss rancher, as well as a road engineer.

He is a game warden, too, so the wild life of the forest comes under his protecting eye as well as the herds of cattle. And the animals include, a lot of us two-legged animals such as campers, and hikers, and fisherman, and berry pickers, and hunters, and trappers, and stockmen, and loggers and water power men. Of course, there are not enough of them to make the forest fastnesses look like Main Street on a busy afternoon.

The campers and hikers, Bill tells me, used to cause him more trouble than they do now. But nowdays they are getting tamed to the ways of the wild. There are more of them, but most of them are more careful to see that the last spark is put out before they leave a camp site. They don't throw still smouldering cigarette butts in the forest litter, as much as they once did.

That is a big help to Bill. As you know, protection of his forest from fire is one of any forest ranger's biggest jobs. Eternal vigilance is the price of safety to the timber and the animals and even the human beings who use the woods for recreation. Not only are thoughtless, careless campers a menace which often blasts fine stands of timber over wide stretches of land, but many fires in Bill's district are set by lightning.

His look-out men on the high peaks must see the tell-tale smoke of fire from any cause and report it at once. That is one of the main meanings of that 140 miles of telephone lines, and those more than seven hundred miles of roads and trails. The fires must not only be reported promptly, but the crews of fire-fighters must be rushed to the scene of action as quickly as possible, to prevent the spread of the damage.

In his little district---I call it little, because in all its vastness, after all it is just a little corner of one of our 149 national forests --- he has a total summer force of 52 men. That is an average of one man to each 5000-odd acres.

Those fifty-two are Bill's first line of defense against forest fires. Bill is the fire chief. I'm not going to tell you any tales of heroism, of thrilling rescues, and daring struggles of men trapped in the flames and smoke. The records of the United States Forest Service are full of them. They have been told in song and story. Most any old forester can set your spine tingling with some which have never seen print. Some of Bill's men tell me that Bill has some first hand knowledge of fights with the fire demon which have left their scars. But Bill doesn't talk much about such things. With him, it is an everyday job, to prevent fire if possible, to put it out promptly, if started.

Roads must be kept ready for any emergency. Trail, telephone, and road crews must understand where they are to go, and what they are to do, and how to do it. Not only how to do their regular job, but what to do in case of fire, when everything is stopped and all hands fight fire, not as a wild panicky village community sometimes fights fire, but in an organized, systematic way. Bill makes arrangements with agencies and individuals in towns and on ranches near the forest borders to hire extra fire fighters when needed, assembles fire tools at strategic points. His job is to see that his protection force functions promptly and efficiently at all times. That takes training, and leadership, and inspection on his part.

And fire fighting is only the chief of his many duties. There are sales of timber from the national forest to look after and check on. In fact, Bill and his brothers have a thousand and one jobs, but I'll have to put off telling about the others until some other time.

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ANNOUNCEMENT: You have just heard a brief outline of some of the many varied duties of the forest rangers in the United States Forest Service. This outline is one of a series called "With Uncle Sam's Naturalists" which this Station --------presents in cooperation with the United States Department of Agriculture.

UNITED STATES DEPARTMENT OF AGRICULTURE

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WITH UNCLE SAM'S NATURALISTS. Friday, December 18, 1931.

NOT FOR PUBLICATION

Speaking Time: 10 minutes

ANNOUNCEMENT: Every two weeks at this time our Wilds Man tells us about his visits with Uncle Sam's Naturalists. Today he is scheduled to tell us what Mr. Frank C. Ashbrook, in charge of the Division of Fur Resources of the United States Biological Survey, has to say about fur farming.------Here is the Wilds Man now.

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Out-of-the-way places in nearly all parts of the globe yield fur animals to the fur trade. Naturally, the colder countries produce the finest furs. Alaska and the Hudson Bay region of Canada are famous for furs, but the wilds of every one of our northern States yield fur animals.

But, strange as it may seem, one of the greatest fur-producing regions of the world is our own Mississippi River Valley. And the American farm boy is even now probably the world's greatest trapper. Ever since the days of the Indians and since the first of those adventurous French wood rangers started fur trading in the middle of what is now our country, trapping and hunting of fur animals have been going on.

The numbers of some of the finer fur animals have decreased, including foxes, and martens, and minks, and fishers, and beavers. There are still, however, considerable numbers of skunks, and opossums, and raccoons, and muskrats. The muskrat, living in swamps and raising big families and raising them often, is one of the world's greatest fur producers.

However, the pioneer who wore a coonskin cap has been succeeded by his collegiate great grandson who wears a coonskin coat, and a flock of granddaughters and great granddaughters who are appareled in the prime pelts from many other fur bearers. As Mr. Frank G. Ashbrook, chief of the Division of Fur Resources of the United States Biological Survey, puts it: "Fur wearers increase faster than fur bearers."

The fur bearers not only are being trapped out to supply the trade, and crowded out by the encroachment of cities and farms on the wilds, but in many cases are being hunted down as so-called "vermin" in a mistaken zeal for the protection of other animals and game birds.

Then, too, drought conditions of the past two years have been hard on many of our wild fur animals, especially the swamp living species. Our fur resources are dwindling more and more.

In the meantime, government scientists and fur farmers are demonstrating that fur animals can be raised in captivity and that the fur produced is of better quality than the fur from animals captured in the wild.

Of course, fur farmers, like other farmers, have been hard hit by the depression. But those still in the business are learning more and more how to handle the fur animals.

Before the war there were not over a hundred silver fox pelts offered for sale in this country in a year's time. The enormous prices paid for silver-fox skins led trappers to dig fox pups out of their dens and try to raise them in captivity. Success in these efforts started a boom of fur farming. There was at first a lot of "wild-cat" fur farming by fox promoters, and there were disappointments due to mistakes in the new business of folks who didn't know foxes.

For instance, at first, foxes were treated as scavengers. They were forced to eat refuse and to live in filth. Naturally, such conditions produced poor foxes with poor fur.

Of course, fur animals are not domesticated stock in the ordinary sense of the word. They are still wild although raised in captivity. But fur farming is like any other livestock raising in that the fur farmer should know his stock and understand animal feeding, and breeding, and management.

As with other kinds of livestock, sanitation is essential. Fur animals need clean food and clean surroundings to prevent diseases and keep them in good condition. They must be kept in good condition to produce good fur if they are to pay for their keep, and give the farmer a fair profit.

The United States Biological Survey maintains a Fur-Animal Experiment Station at Saratoga Springs, New York, and a Rabbit Experiment Station at Fontana, California. Research and experimental work is conducted at both places. The idea is to find out things of value about all kinds of fur animals now being raised on fur farms in this country. At the Experiment Stations investigations are made of the best management practices regarding feeding, breeding, and housing.

Getting back to silver foxes, Mr. Ashbrook estimates that ninety-nine per cent of all the silver-fox fur produced in this country is from animals raised on fur farms. This means that so far as silver fox fur is concerned, fur farming is practically the whole thing.

Silver fox farming is, however, the longest established of our fur-farming businesses. The total of furs produced on fur farms is but a drop in the bucket compared to the total fur production from the wild.

But following on the heels of the silver fox farmers, others have gone in for mink and muskrat raising. Minks are not hard to raise in captivity when fed and handled properly, but it is a problem to raise them on big enough scale to make the business pay. With muskrats, however, the marsh itself produces the food, and the muskrat care for themselves. This system of fur ranching, or trapping on privately controlled wild regions, has proved profitable in several sections.

Skunks are not held in bad odor-- as fur producers, that is-- but at present market prices more money must be spent for feed and labor than can be realized from sale of the pelts. The same is true of opossums and fitches. However, any one considering fur farming with any of the fur animals may well avail himself of the information to be had free of charge from the experts of the Bureau of Biological Survey of the United States Department of Agriculture.

The Department also has a publication giving "Recommendations to beginners in Fur Farming." Ask for Leaflet No. 27-L.

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ANNOUNCEMENT: That leaflet is Leaflet No. 27-L giving "Recommendations to Beginners in Fur Farming. You can get it free of charge either by writing to this Station----- or by writing direct to the United States Department of Agriculture, at Washington, D. C. Station_____ cooperates with the Department of Agriculture in presenting the talk to which you have just listened.